THE QUARTERLY MAGAZINE OF THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
VOL. 11 / NO. 3 WINTER 1973

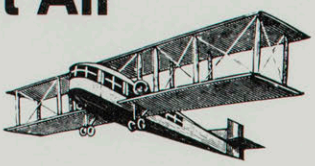
Terra

Take Our Time Machine To New Guinea

Travel 10,000 years into past time to the famous New Guinea "Sing-Sing," see natives in full tribal costume dance and sing in ancient spectacle. This Museum Alliance tour includes possibilities of individual excursions to other Pacific scenes of primitive beauty and contemporary interest. The dates: July 17 to August 7; the cost: $2,750 for this exciting guided tour. Call the Museum Alliance, 749-3583, for further information.

Gretchen Sibley's article, "Amidst the Awful Mansions of the Dead" (page 20) presents but a brief survey of the history of man's burial practices. Of necessity, voluminous notes on interesting and important burial customs had to be left out. The author is doing a comprehensive study of these burial customs and is often told fascinating tales by travelers and students. Perhaps you too have seen interesting graves, cemeteries and burial customs. Miss Sibley would appreciate your sharing them to add to her study. She can be reached through the Natural History Museum of Los Angeles County address.

Be Above It All



Up with people! Museum Alliance people, that is, up into the air for the second Museum Alliance Fly-Over on Saturday, May 5. This time our view is of California and a bit north: the PSA 727, piloted by the same veteran pilot Captain Mike Bogle, will fly over parts of the San Andreas fault system, Mt. Whitney, Yosemite, Tahoe, Oroville Dam, Mt. Lassen, Shasta Dam, Mt. Shasta, and Crater Lake, before swinging south over Clear Lake, Pt. Reyes, Drake's Bay, Monterey, Big Sur, the Salinas Valley, San Simeon, Morro Bay, and the Channel Islands. Dr. Harry Walker, Associate Dean of the College of Agriculture and Environmental Sciences at U.C. Davis will once again be our geological master of ceremonies. Only 120 members, only $60 per person, only a few weeks to go.

Historical Archaeology

Come and see this new permanent exhibit of maps, photos, and artifacts discovered by the Museum staff during several field trips in 1971 to Mule Hill, where General Kearny withdrew on December 7, 1846, after the Battle of San Pasqual. But first, read Konrad Schreier's article about the Battle in this issue of *Terra*.

About the cover

Faces of Acopia, a highland Peruvian village, photographed by José Louis Sedano.

TERRA editors wish to thank Mr. W. Thomas Davis for the funds which provided the color separations for the Acopia article. The Natural History Museum of Los Angeles County is grateful for the contribution which will provide the color for the Acopia exhibit, beginning in April.

Overheard in front of the Elephant Diorama:
"Why is an elephant so wrinkled?"
"Have you ever tried to iron one?"

Terra®

The Quarterly magazine of
THE NATURAL
HISTORY MUSEUM
of Los Angeles County
VOL. 11/NO. 3 WINTER 1973

contents

Acopia 3

Building the World's Largest Flower 12

Mast High to Growler 15

"Amidst the Awful Mansions of the Dead" 20

Kearny at San Pasqual 28

All Rights Reserved.
Reproduction in whole or in part, without permission is prohibited.

EDITOR/Dorothy H. Seligman
ASSOCIATE EDITOR/Harry Pack
ART EDITOR/Frank Page
ASSISTANT EDITORS/Giles W. Mead/Gretchen Sibley/William A. Emboden Jr./Kilbee Brittain
EDITORIAL ASSOCIATES
Sage Belt/Jane Dart/Theodore Downs/Peter Furst/Mary P. Goodwin/Glenn Hiatt/Betty Reddin/Katharine Hotchkis/Harry Kelsey/Richard Lipscomb/Fred S. Truxal/Robert Wade/Robert Weinstein
STAFF PHOTOGRAPHER/Armando Solis
STAFF ILLUSTRATOR/Mary Butler

photo 1 Acopia

ACOPIA

Acopia, a small highland Peruvian town, is in the heart of what was once the Inca Empire. The name means sandy place (*Aco*-sand, *pia*-place) in the native Quechua, and the harshness of the environment warrants this description. Located between two lakes sixty-five miles south of Cuzco, it lies in the middle of the Peruvian *sierra.* (see map). Isolated at 11,430 feet, the town is a brisk two hour walk from the Cuzco-Puno railroad which leads south to Bolivia. Communications are made a bit easier by the errant Saturday truck, which, with luck, takes people to the local market. The depleted soil and primitive agricultural methods make the life of the people a struggle for survival and threaten the isolated town itself (photo 1–Acopia).

The harshness of the physical world is comparable in many ways to the struggles in the social world. The Latin American dichotomy of *mestizo* and Indian pervades the social environment of Acopia. The May 1968 census listed Acopia's population at 2,076, 80% of whom were Indian and 20% of whom were *mestizo.* The world of the Indian, which is bounded by the local community, is characterized by "peasant" social relations and has many pre-Columbian and colonial cultural traits. The *mestizo,* who is more a part of the national culture, wears European clothing and is frequently the agent of change. Often indistinguishable physically, the Indian may become a *mestizo* by developing a whole new range of social skills. This often occurs through service in the army in which the Indian learns Spanish and becomes sophisticated in the ways of the city. The relations between the two

Although the *mestizo* is frequently wealthier than the Indian, the actual working conditions of both are brutal. The agricultural techniques are simple and most of the people in Acopia spend their lives tilling the depleted soil. The toil involved would quickly tire those accustomed to city living.

Rising with the sun, men, women and children all work in the fields. The tools are simple: ox-pulled plows, sickles and threshing sticks are combined with the pre-Columbian *chaquitaclla* (digging stick), *taclla* (adze) and clod crusher. Energy is provided by humans and animals with a minimal use of machinery. groups are frequently strained as the *mestizo* takes advantage of all opportunities to "get ahead" while his simpler country cousin, the Indian, is bound by more traditional patterns.

THE SANDY PLACE

A Highland Peruvian Village

by **Elizabeth Davis Bond**

photos by Jose Luis Sedano,

There is some irrigation from the local lakes and streams, but most of the water comes from sporadic rains. Men plow and wield the heavy *chaquitaclla* while women and boys weed, bank, plant, fertilize and harvest (photo 2).

Drugs have been used for centuries by the highland farmers to deaden their senses to the harsh environment and arduous work. When compensation for work is through the traditional *aine* system, a host invites several workers to his plot, gives them food, alcohol and the indigenous narcotic, *coca,* which is grown in the *montaña,* is chewed to alleviate the effects of the work and the altitude.

In Acopia, the *mestizos* have come to own much of the land. Since the Indians choose these *mestizos* to be godparents *(compadres)* of their children, the *mestizos* can often command a large work force based on these ties. The Indians work for small wages or grain. The traditional *aine* system of the Indians and the wage oriented system of the *mestizos* come into conflict especially at the harvest when there is a labor shortage.

While the European conquest introduced many elements which have resulted in the Indian-*mestizo* conflict, other contributions have helped to make life easier. The subsistence crops are a combination of indigenous American plants and European imports. Barley and wheat are of European origin while potatoes, maize, *quinoa, lizas, ocas* and beans are from the Americas.

The cycle of plowing, planting and harvesting these crops determines the annual activity round and much of the ritual calendar. Land disputes are settled and plots laid out at the *Repartición* ceremony in March. Family heads and town officials have usually settled the disputes privately before the actual ceremony and the official action of the local governor is simply a ritual. The plowing begins soon after *Repartición* and stops shortly before Easter. In the meantime, the growing fields of *ocas* and *lizas* are harvested about the first of May. Potatoes and barley are harvested in June. *Ocas, lizas* and potatoes keep well in the near freezing climate. A very ancient technique of frost drying is used to turn the potatoes into a dehydrated wrinkled foodstuff called *chuño,* which looks like a rock. As unappetizing as it appears, this *chuño* expands when it is cooked and probably constitutes the first "instant potatoes."

A ceremony for blessing the land is performed before the first planting in August. *Coca* and different herbs are used to invoke spirits who protect the crops and give the community good health. Beans and potatoes are planted in August and a later planting is done in October and November for *potatoes, quinoa, ocas, lizas* and barley.

Wheat and barley are ground by millers who have water powered machinery (photo 3). The wheat is sold to the market or ground and sold as flour, but it is considered too valuable to be eaten. The barley flour is occasionally made into bread, which is eaten as a meal with coffee. As in other parts of Latin America and Southern Europe, bread dolls are baked for All Soul's Day, November 1, and placed on the grave of dead relatives for the returning spirits to enjoy. In Acopia this bread is made from barley flour in the shape of human bodies and small molded candy heads are bought in the market place and attached to the bread. The night of All Soul's Day is considered one of the best celebrations of the year with the bands playing until dawn and people sitting around the graves of their relatives (photo 4).

Animals are also considered too valuable to be eaten except on rare occasions. Whatever hunting may have existed in earlier periods, there is no trace of it at the present time. All of the available plants are used for humans or for their domesticated animals. Families keep pigs, sheep, *llamas,* horses and cattle, all of which are periodically sold and seldom eaten. Sheep are shorn every year or two and yield wool which is the basic clothing material. Horses, mules and *llamas* are used as beasts of burden (photo 5). People make cheese from cow's milk when the cows are nursing, but there is not a regular dairy industry. The animals have a series of holidays in the year. On May 15, San Isidro Day, the young bulls are run through the town, usually by the eldest son in the family. The sheep are blessed on June 24 at the festival of San Juan.

The diet consists of a soup made from different starchy ingredients such as potatoes and *lizas.* Rice is also a staple although it must be imported. An oddity to the European palate, but the basic source of protein for the Peruvian Indian, is the guinea pig. These are kept in the kitchen and killed from time to time to provide some meat.

The diet is uninteresting, the work severe, and the countryside bleak. The textiles are glorious. This bit of color and beauty is almost the sole expression of high artistic merit which is produced today by the Peruvian peasant in their routine existence. Both men and women weave, and people of all ages are seen twisting thread with a spindle. There are several master craftsmen in Acopia, although all the weavers are very good, It is through many of these textiles that we see creative design work and an enjoyment of color of these people.

Some elements of the Peruvian dress and textile work are derived from the pre-Columbian period, but the colonial era still predominates in the styles. Different indigenous dyes were originally used, but the colonial period saw an introduction of new hues. Both these types of dyes have been largely replaced by aniline dyes. This last category, invented in the middle of the nineteenth century, drastically altered the "palette" of weavers throughout the world.

The horizontal loom, in which the fabric is laid out on the ground, and the Spanish standing loom are both found in Acopia. The basic material which is produced is *bayeta* (English: baize), a heavy woolen cloth. This cloth is embroidered with a sewing machine using commercial threads or decorated with patchwork.

There is a tendency for each Peruvian town to have its characteristic costume and weave. In Acopia, the work *poncho* is red with a rosette design woven in stripes. *Coca* bags, which are carried everywhere, are made with the same pattern. There are other naturalistic and geometric designs which may have complex meanings but the people are reluctant to talk about them. The stitched designs are often geometric, and the Peruvian flag is a frequently used motif on non-woven articles of clothing in Acopia (photo 6).

The Spanish Colonial influence is very noticeable in the clothing of the highland Indian. The "typical" dress for a man is a pair of under trousers, *calzoncillos* and a shirt, *camisa* made from heavy white cloth purchased in the market. Pants made from *bayeta, pantalones,* are worn over the *calzonillos* and both may be embroidered. A *chaleco,* or vest, may be made at home or purchased in the market and is constructed from felt-like wool, two pieces of which are sewn to a canvas backing. Over the *chaleco* is a *solapa* or European-style jacket made from *bayeta.* All of these are embroidered with bright threads using the treadle sewing machine which is "more common than transistor radios." All men, even *mestizos,* wear a *poncho* over their clothes.

The women of the highlands sport a

grand variety of hats. These range from fedoras to what appear to be lampshades. In Acopia, the characteristic hat looks like an inverted bowl. Women wear a series of skirts or *polleras* with as many as seven for holidays and at least three for every day. The outer *pollera* is black and the second one red. The hem is faced with *bayeta* and the waist band is a strip of woven material purchased in the market. The women also wear a *camisa* of heavy material and a felt-like jacket, *jobona,* stitched with designs similar to the man's *chaleco. Llijllia* is a term used to refer to a wide variety of blanket-like garments used by women. When she is dressed for a festival day, a woman wears a *Llijllia* made from the same felt-like material as the *jobonas* and *chalecos.* This *Llijllia* has a corner folded down and is worn like a shawl. Other Llijllias in various sizes made from *bayeta* are used to carry children, to display food in the market place, and for many other purposes.

Women usually go barefoot, but men purchase *ojotas* or sandals made from rubber tires. Plastic shoes and European shoes may be worn for special occasions.

While the costumes described are "typical," a wide variety of pieces are actually combined in any one outfit. As may be seen from the pictures, a miscellaneous combination of worn out old clothes are used for work in the fields. The only real difference between festival clothing and everyday clothing is that the festival clothing is relatively new and clean. There is, however, a dress *poncho* which is worn for special occasions, and town officials may have several *ponchos.* The time when the "regalia" of a town is seen is on festival days (photo 16).

Once a year in Cuzco, there is a regional contest for the best dance groups judged on their musical ability and costumes. Although many of the costumes are pure fantasy, the people of Qqueros, a small town northeast of Acopia, are famous for its maintenance and elaboration of traditional styles (photo 7).

Although none of them approach the weaving work in quality or imaginativeness, there are several other industries in Acopia. Wood, bought in the marketplace, is worked extensively. The wood is used to make musical instruments, tables, chairs, and the carpenter's steadiest business, of course, is coffins. With the formation of a new family, a house is built. Children gather reeds from the lake while women wind the fibers into cord which is used to

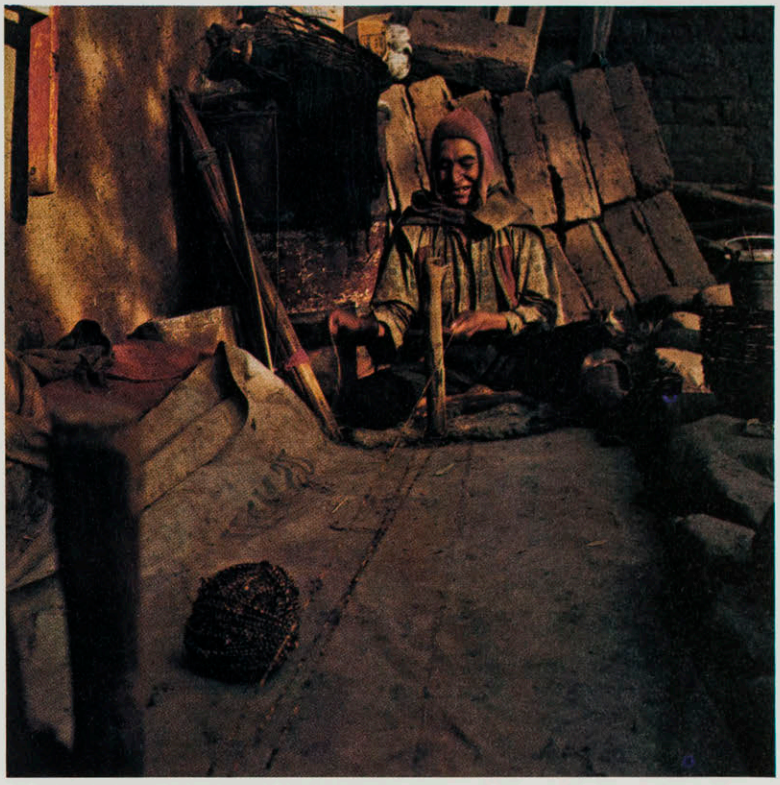


photo 6 weaving

photo 2 *chaquitaclla*

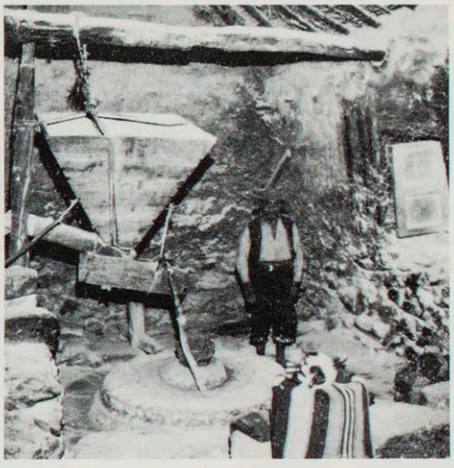


photo 3 barley milling

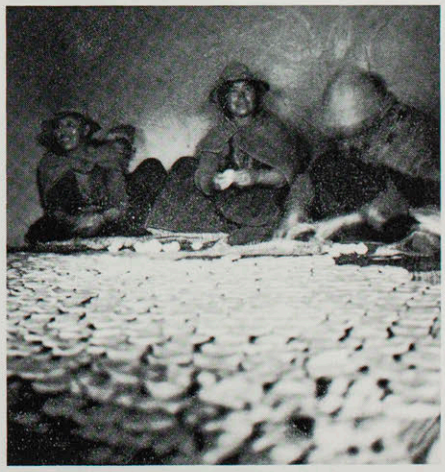


photo 4 baking
All Soul's Day bread

fasten the thatch. The body of the house is made from stones and adobe bricks (photos 8, 9).

Although the agricultural activities, animal husbandry and secondary crafts supply many of the needs of the town, the resources are not sufficient or varied enough to handle all of the traditional wants. Industrial development has also created a whole new series of tastes. Markets form a linked chain which branches from central cities to regional towns and ultimately to settlements like Acopia. The largest market near Acopia is Cuzco; however, the inhabitants of Acopia go to the Sicuani and Combapata market located on the railroad from Cuzco to Puno (see map). Sicuani has a population of 12,000 and a large market is held there on Saturdays and Sundays. There are other markets held throughout the highlands on different days. Although the towns appear to be isolated, the dates and places of various markets always seem to be known by the people who have goods to purchase or items to sell. Although there is no formal market at Acopia, women will sit around the plaza with small bundles of agricultural products displayed in front of them.

The *mestizo*-Indian dichotomy is very apparent in any of the local markets. The Indian woman participates mostly in barter exchange with *coca* being her big cash purchase. The *mestizos,* on the other hand, are often professional marketeers, the women as retailers and the men as wholesalers (photo 10).

The intricate system of markets has developed from numerous circumstances. Climate determines many of the trade routes. One of the most important of these is the route to the lowlands which lie on the Eastern half of the Andes where the mountains plunge into the Amazonian rain forest. Known as the *montaña,* this tropical zone produces *coca,* fruits, *aguardiente* (local alcoholic beverage), rice, peppers and similar products. A substantial business is carried on by wholesalers who take truck loads of produce from the *montaña* to the *sierra.* Some of the people in Acopia keep *llamas* to be used by caravans going to mountain stations where goods are delivered from the lowlands.

Geological accidents have also affected the layout of the trade networks. Major deposits of clay are found in the area around Puno and all of the local ceramic ware comes from this zone. Pucara is the major ceramic producing town.

The demand for industrial goods has created marketing links to Lima and other coastal cities and ultimately to the industrial centers of the world. Goods are brought to Cuzco and other cities from whence they enter the provincial trade networks.

Finally, people participate in the trade networks to adjust to the fluctuations in seasonal production. For example, a particularly good potato harvest in one part of the highlands may provide surplus crops which are exchanged with another zone that is facing a famine.

Each life begins in Acopia facing these difficult circumstances, the poor quality and quantity of food, the limited social opportunities and the hard physical labor which is implied. Except for the period of courtship and the recreation which holidays and different games provide there is little relief from the tedium. A boy will begin working with his father and the other men when he is very young. By ten, he is considered competent to perform half the work of a grown man. By sixteen or seventeen, he is considered a full adult. A girl will learn from her mother and by twelve she is able to weave and to cook. There is a brief period of courtship in which couples begin to live together and they are considered married by their late teens. No formal marriage ceremony is performed unless a priest comes to town, at which time there may be a "mass marriage" of all unmarried cohabiting couples. As the marriage ceremony is expensive, only older couples will voluntarily participate in one. Formal schools only effectively reach Spanish-speaking *mestizos.*

Both boys and girls are baptised and acquire godparents *(padrinos)* at that time. There is also a *padrino* for the haircutting ceremony held in late childhood for boys and for the ear-piercing ceremony for girls. Other *padrinos* may be chosen for marriages, but the birth *padrinos* are the most important. The significance of this tie, which implies many gifts and responsibilities, is marked by the *Compadres* Day, February 26 and 27 for men and February 28 and March 1 for women. People who are *padrinos* for others or for their children call one another *compadre* and go on drinking sprees together (photos 11).

In Acopia, four patron Saint's Days are celebrated, St. Bartolome, St. Roque, St. Jeronimo and el Sr. Purificador. The celebrations are virtually indistinguishable; the local band plays, a resident or visiting dance group performs, a procession with all the images of the saints is held, a Mass is said if the priest is available, and everyone is drunk. *Carnaval* is also the occasion for a night long party.

Although Acopia is the focus of the social and ritual life of the inhabitants, the people will often travel many miles on pilgrimages to sacred sites. These trips bring them in contact with other parts of Peru and often provide an opportunity for visiting and marketing, as well as religious devotion. A notable example is the annual pilgrimage to Collurite to worship a cross which is considered to be particularly sacred (photo 12).

Within the traditional Indian social system, the political and religious spheres are intimately linked. Each Saint's Day *fiesta* is taken on as a *cargo* or "charge" of a particular person. That person is then responsible for the cost of the party and for arranging the celebration. *Cargos* are usually ranked so that after the fulfillment of several a man is eligible for a political office. The expenditure of funds for the *cargo* also provides the individual with prestige and helps distribute the town's scanty resources (photos 13, 14, 15).

In Acopia, participation in the *cargos* does not guarantee political office. The present *alcalde* is a *mestizo* and he derives his power from the local government authorities and from the *guardia civil,* or federal police, who are resident in the town. The Saint's Day celebrations do, however, confer prestige and there is a *de facto* town council of Indian family heads who exercise authority (photo 16).

While all of the elements of stability would seem to be present in the town—a well working political system, a sparse but varied economic system, a complex trade network—things do not run smoothly. The shortage of arable land provides a strain that produces constant tension in the town. A newly married couple expects to be given land. When parents die, the youngest son inherits the house, but the land is divided more or less evenly among the children. As there is not enough land to balance the birth rate, there is constant feuding over property rights and endemic distrust between and within family groups.

Various ways of resolving this conflict have helped to create some adjustment to the population pressure. The land is worked with an extensive fallow system, but the soil is badly depleted. To limit migration into the area, in-marriage is encouraged and strangers are subject to witchcraft attacks.

The major adjustment, however, is through out-migration. A reasonable es-

photo 8 children collecting reeds

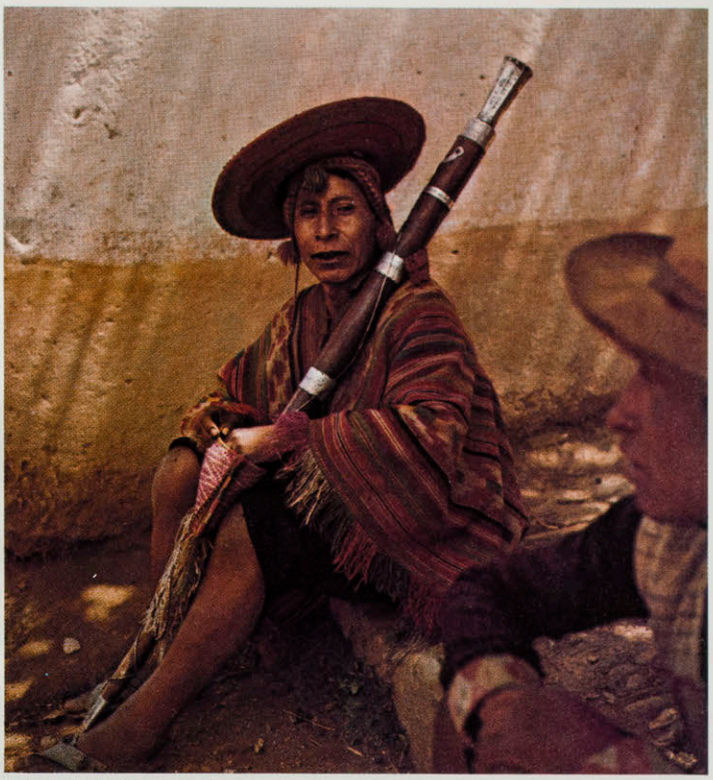
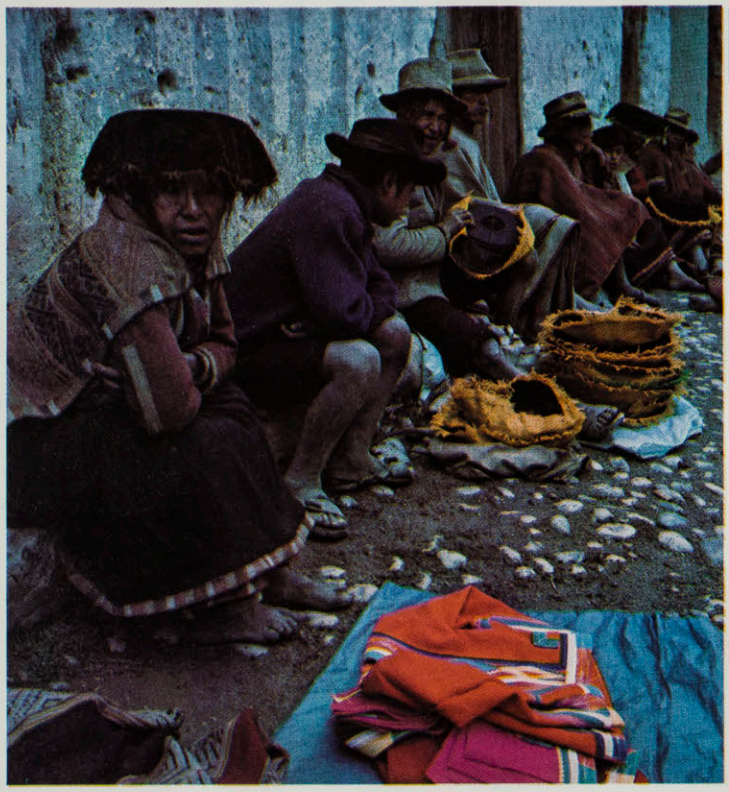


photo 16 Indian *alcalde*

photo 11 baptism

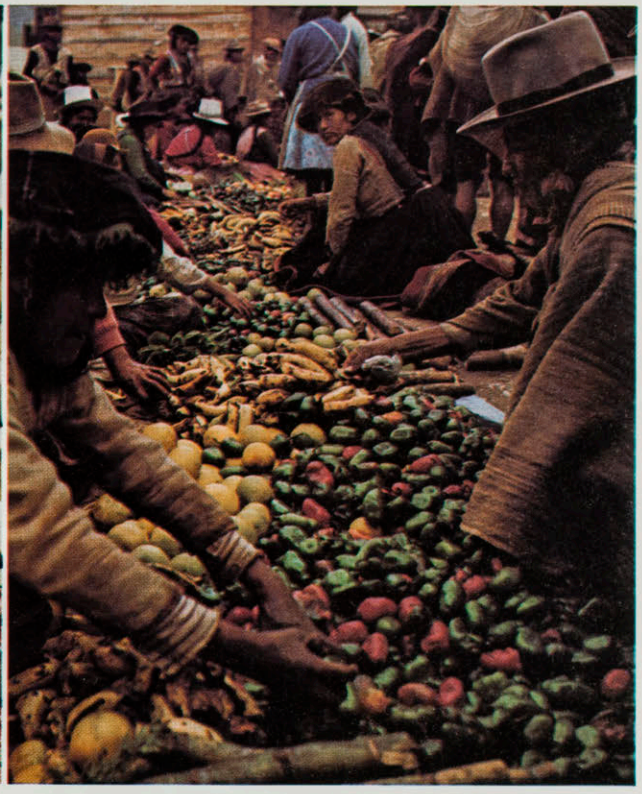
photo 9 house building



ACOPIA

Markets form a linked chain which branches from central cities

photo 10 Note the contrast between the mestizo in the left foreground with her abundance of goods and the Indian woman.



to regional towns and ultimately to settlements like Acopia

timate for Acopia is that 20% of the population produces enough to participate extensively in the market system, 50% break even, and 30% leave town. Some of the migration is to the highland *haciendas*. There the farmer may become a tenant, a field hand, or a domestic servant. The recent Peruvian revolution and land reform acts have limited this alternative. Some go to the cities to seek work and others migrate to the mines in the *montaña*.

Acopia is in precarious condition. While the expropriation of *hacienda* lands may relieve the pressure in some parts of Peru, it is difficult to see how the reapportioning of the land into small family plots to be farmed by traditional techniques and with a traditional tenure system will be more than a temporary solution. As there is no *hacienda* near Acopia, not even this temporary relief is in sight. Although change is occurring slowly, the problems facing this poor peasant economy would seem to persist. For Peru as a whole, the coastal cities become more crowded with thousands of people who have no occupations.

José Luis Sedano, the Peace Corps volunteer who lived in *Acopia* and who provided much information as well as the beautiful accompanying photographs for this article, offers his own opinion of the problem:

I see health, education and illiteracy as the most pressing needs the Peruvian Indian faces today. These problems are compounded for him in the urban areas such as Lima. However, there is still a greater problem facing the nine million native Peruvian Indians—that of bigoted discrimination. I found that the often unspoken attitude of "they're only Indians" on the part of middle class *mestizos* must first change before any meaningful change can begin. Fortunately that first step has begun and in some parts of the *sierra* and *altiplano* the Indian is regaining his civil rights and self respect through economic independence. The Peace Corps, I'm happy to say, has played a small role in changing this attitude by helping to start Indian co-ops in native arts and farming. The Catholic Church in Cuzco is also active in bringing about social change for the Indian. Father Molina, a native of Spain, is working with the Archbishop of Cuzco and has opened a vocational training center for the urban Indian of Cuzco. And in Puno the Maryknoll priests are also working to bring about a change in this attitude.

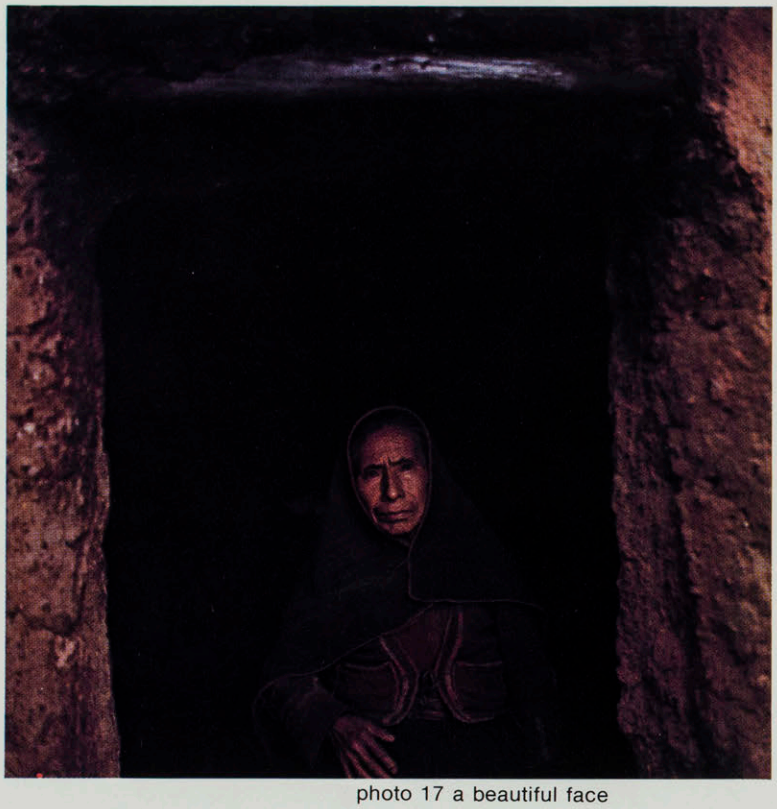


photo 17 a beautiful face

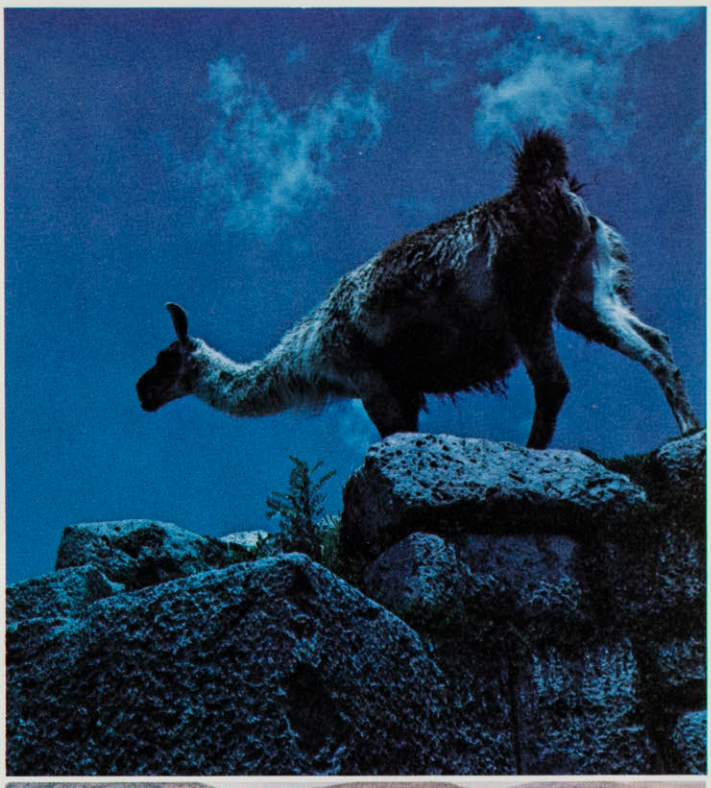
As can be seen from the beautiful photographs on these pages, life is still a magnificent rich tapestry even under the harshest condtions. Somehow, Acopia will survive.

Elizabeth Davis Bond, B.A. and M.A. at UCLA, is presently working on her Ph.D. at University College London, in Anthropology. She helped organize and write the catalogue for the exhibition, Ceramics: Form and Technique, at the Ethnic Museum, UCLA. This is her first TERRA article.

José Louis Sedano worked as a field correspondent for the UCLA Museum of Cultural History while in Peru with the Peace Corps. He is a professional photographer and film maker whose photographs will be a major part of the exhibition, Acopia: Life in a Peruvian Village, to be on display at the Natural History Museum beginning in April.

The author and photographer wish to thank Mr. Alex Deutsch, whose funds made the original field work materials and photographic equipment possible.

photo 13 band



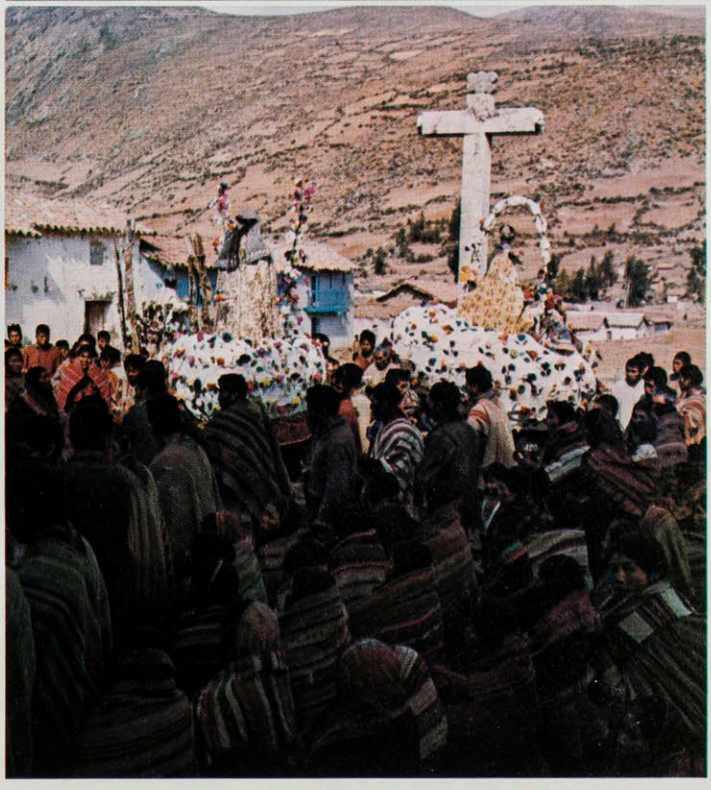


photo 15 dancers
photo 7 costumes of Qgueros

photo 5 *llama*
photo 12 pilgrimage to Collurite

Building the World's Largest Flower:

The Genesis of a Model

by **Carl Gage**

Biological model making has proved to be an exciting career for me. With each of the great number of models I have designed, my insight into the intricate nature of the plants and animals around us has grown through the close association one must have with any subject on which a detailed model is based. These models have been challenging, rewarding and even amusing as I found when confronted recently with a rather peculiar commission—that of building the world's largest flower.

The Orchid Society of Southern California has for some years given a sum of money to the Botany Section of the Natural History Museum of Los Angeles County without stipulating the use to which it should be put. Dr. William Emboden, acting senior curator of Botany, came to me one day with a folio half-concealed under his arm and an idea half-concealed on his face. Would I consider constructing *Rafflesia arnoldii*? Sensing a need for some clarification he proceeded to show me some sixteen engraved plates in a rare folio from the Museum's Library: *Miscellaneous Botanical Works of Robert Brown,* Volume III. He explained that he had discovered this atlas among other rare volumes and was ecstatic over finding this series of original copperplate engravings of the life cycle of one of nature's most monstrous productions and certainly the largest single flower in the plant kingdom. My interest was piqued, so he proceeded to explain that he could supply further color photographs, but the plant being a fleshy Malaysian growth, no preserved material was immediately available.

I was intrigued by the proposition, and so, as though to elicit further interest, Dr. Emboden gave me an account of the discovery of this parasitic flower by Dr. Joseph Arnold in 1818, in which the famed naturalist described the flower as "the greatest prodigy of the vegetable world," and then "poor Arnold" passed on. This tale was recounted by Dr. Emboden in the Winter, 1972, issue of *Terra.* I could hardly refuse the challenge of duplicating or recreating this awesome monster, which seemed to me most like a fleshy washtub. As a parasite it was without leaves, roots or any appreciable stem.

Having consented, I ruminated on the many processes which were to be involved and started making my own sketches of the model, using the Ray Society engravings, an illustration by Miss Mary Butler of our staff, and the photographs from *National Geographic Magazine.* These would serve me well in initiating a model. Since each petal was to be slightly different in shape and textural patterning, a system had to be devised which would allow for these modifications. A modeling clay petal was formed by hand using dimensions from the preliminary drawings. For the time being, texture was ignored and a layer of twenty minute gypsum casting plaster was poured into the clay petal shape (fig. 1).

After setting, the resulting negative plaster mold was removed from the clay (fig. 2) and surface texture on the petals was added by cutting into the plaster mold with a rotating cutter. Following this procedure detailing of these "bumps" was achieved by scraping each of the cut areas with a small round ended spatula (fig. 3). The surface of the plaster was then coated with a wax compound to act as a separator to prevent the final polyester resin cast from adhering to the plaster.

Desiring to achieve something of the flesh color in the polyester resin which was to comprise the final form, I mixed a cream colored pigment and added a silica filler to prevent run-off from the surface of the plaster mold. A cup of this

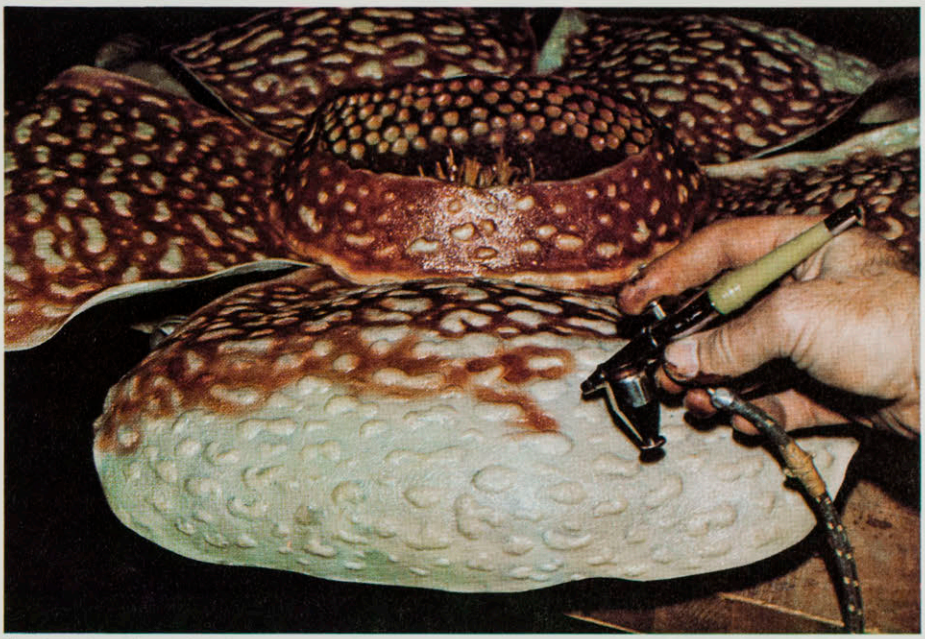


fig. 8 Airbrushing details on the final model

Photographs by Carl Gage

resin was catalyzed and brushed onto the entire surface of the mold obscuring the white plaster surface. When this pigmented resin had jelled, a layer of glass fiber matt and resin was added (fig. 4) until it achieved a leathery hardness. Excess plastic around the periphery was trimmed with a knife and the hard polyester resin cast was then removed from the plaster mold (fig. 5) and the edges further refined by sanding.

Having completed the rough final form for one petal, a series of four other petals compatible in form with the first had to be modeled. Each was of necessity different and had to keep proportions compatible with the original petal. While the original clay petal could be used again and again, it had to be remodeled each time and a new plaster mold made from it.

All of these processes were used to cast the center cup of the flower and the fleshy collar surrounding it; it is here the reproductive organs are seated. This form was placed upside down and the petals were arranged about it in a ring and after adjustments the whole assembly was united with resin and glass fiber. (fig. 6).

Now I was prepared to work on the bowl containing the reproductive parts. Noting some inconsistency in presentation of these, I consulted with Dr. Emboden who explained that we had to choose between a male or a female flower as the sexes were borne separately on different flowers; it was decided that we would have a male. The reproductive parts had to be seated on a disc, and all of this had to be modeled in clay, just as the petals, leaving the detailing of reproductive organs until the final stages (i.e. to be carved into the plastic cast). A complex wax and plastic mixture was then heated to the melting point and brushed upon the clay form. When this had cooled the clay was removed leaving a waxen mold. Pigmented polyester resin was poured into the resulting mold and allowed to harden.

At this point I think it appropriate to note that such procedures are neither simple or fool-proof, for as the wax and plastic mixture did not release from the cast a great deal of time had to be spent laboriously scraping off the layer of wax so that subsequent additions of resin or paint would adhere properly. Such are the "malfunctions" that occasionally plague a model maker and which can be solved only by the ingenuity that comes from years of experimentation and endless perseverence and patience.

Pale fleshy warts cover the inside of the central ring of the flower, and each of these, like a snowflake, has a slightly different shape. Thus it was necessary to form numerous original shapes which could be pressed into clay to form the hundreds of negative forms which were to serve as molds for the final polyester plastic forms. Positive impressions were taken from the molds, were washed in mineral spirits, and cemented in place with epoxy resin followed by careful brushing of paint around each of the "warts."

One of the most perplexing problems arose when considering the manner in which to portray the thousands of papillae which finger their way into the bowl from its inner walls. I finally decided to use a modified verterinary syringe and pigmented epoxy resin thickened with microcrystaline silicate and to apply each of these tiny fingers in succession. This was a very time-consuming aspect of the project, but the ultimate realism sought for made the laborious procedure well worth the time spent. (fig. 7)

The bract-like supporting structures under the petal are inconspicuous and dark by comparison to the true petals. These were all formed from polyester resin and glass fiber from a single plaster

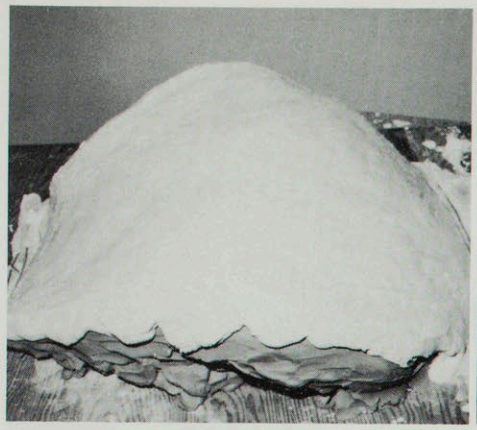


fig. 1 Plaster mold applied to clay pattern of a petal

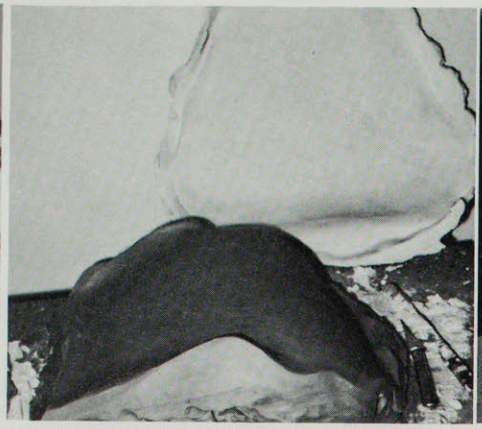


fig. 2 Negative mold of a petal

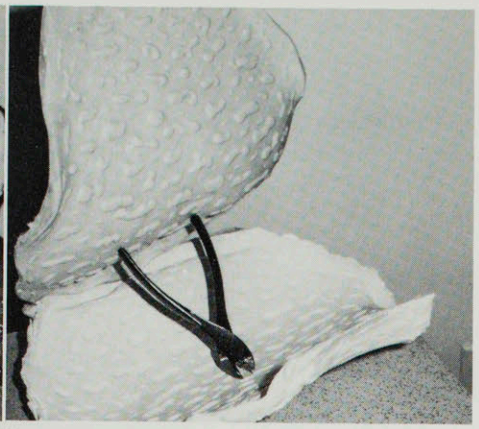


fig. 5 The resin petal upon removal from a plaster mold

mold. Color was achieved by a lacquer spray and these were then affixed to the underside of the flower.

Finally the true colors of the flower had to be duplicated using lacquers sprayed with an airbrush followed by a sprayed textural layer of polyester resin, and a bit more lacquer to finish the finer details. (fig. 8)

Dr. Emboden had seen a few of these forms as they were cast and had seen the crude flower assembled, but the final work seemed to take him aback. As he remarked, "it has all the awesome beauty of the Malaysian giant and will be the focal point of our Hall of Botany. The elusive and rare fleshy giant parasite is now preserved for posterity by way of a craftsmanship and technology which no museum in the world is likely to duplicate."

Carl Gage is a Model Maker at the Natural History Museum of Los Angeles County. He brought a magnificent model fly into the Museum at age 16 which so impressed the Exhibition Department that he was hired on a contract basis to make insect models. After finishing high school and UCLA he was hired full time.

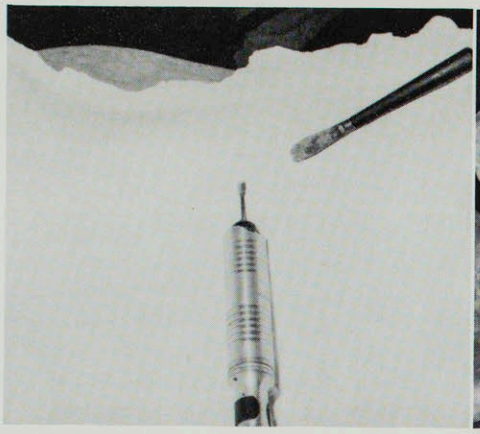


fig. 3 Putting surface texture onto a petal

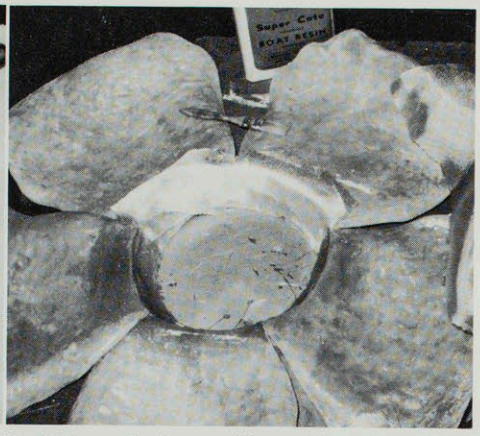


fig. 6 The united assemblage of *Rafflesia arnoldii*

fig. 4 Making a fiber glass cast of a petal

fig. 7 Putting "papillae" into the floral bowl via a syringe

Mast High to Growler a Frozen History

by **Mary P. Goodwin**

Photo by Mary P. Goodwin

The air is full of wind-driven snow. Along the ground rounded ice-hard particles scour the packed surface into linear grooves. Above, fine ice crystals condense in the barely moist air of the blinding sunlight. They mix with the blowing snow. A high whistle is deafening. It is 55° below zero. The 14,000 foot plateau is white and barren. A man cannot stand here against the force of the wind; breathing would freeze his lungs. It is the center of the Antarctic continent and this is where the ancestral iceberg begins its life.

The polar ice cap in central Antarctica averages 12,060 feet thick and a New Zealand team recently calculated a 15,870 feet thickness near the Soviet interior station of Vostok. The ice rests on bedrock, pressing it down to 6500 feet below sea level. This snow and ice has been accumulating for up to 33,000 years at the slow rate of three to four inches per year. Since it never melts, here has grown the world's largest ice sheet.

Draining this great continental mass of ice are ice streams within the northward and downward flowing ice sheets, outlet glaciers, valley glaciers, ice shelves and floating ice tongues. The circumpolar weather is responsible for the build-up of ice, for the newly-condensed snowflake, the snow reshaped into ice dunes called barkhans, and sastrugi, wave-like ridges of hard snow. It is responsible for the movement of the glaciers, the drainage from the flow centers of the high plateau, and for the distribution of shelves and pack ice around the periphery of the continent. The enormous ice plateau in turn affects the weather over the whole southern continent.

The Antarctic is a radiative heatsink. The ice-cap with its brilliant white surface acts as a broad mirror, reflecting sunlight, dissipating more heat than it receives. Much of the heat transported towards the Pole in the oceans is also lost. Storms along the coast force warm moist air to rise and heavy snow accumulates over the mountainous edges of the continent. But these storms do not usually reach the interior. The clear skies and dry stagnate atmosphere of the high plateau allow a vast amount of heat to escape and make the central ice sheet one of the coldest places on the earth. (A measurement of 126.9° below zero has been recorded.) Inland, the temperature does not rise enough in the summer to melt the snow. Surface ice is rare. Instead, the snow is constantly shifted by the shrieking wind, added to by the meagre three to five inches per year, and gradually hardens into a light porous mixture called firn. As the weight of more snow over the years increases, the firn is compressed into ice far below the moving surface. This ever-increasing thickness of the ice provides the southern waters with an endless supply of iceburgs, many hundreds of miles away, and thousands of years in gestation.

Drained of all moisture, the cold air settles and katabatic or descending winds of up to 135 miles per hour force it down the slopes of the continent, where it again becomes part of the circumpolar cyclonic winds. Picking up moisture once again, the process is ceaseless.

The direction and rate of the ice down from the polar plateau is determined by the subglacial topography of the land both above and below sea level. A mountain ridge buried far below the sea will act as a dam, over which the mass of ice must compress and lift as it passes towards the coast. The continent is crossed by two long and high ranges of mountains, the highest, the Vincent Massif, rising to 16,860 feet. These are barriers also to be circumvented. There are numerous smaller mountain systems, ice domes, and isolated mountain tops called nunataks. Wide ice rivers slowly wind through and around these land boundaries. They move north, checked, released, deformed. They converge, change direction, surge. Some are confined forever behind high palisades, some end abruptly in vertical cliffs at the sea, and some spread out finally into broad shelves of grounded or floating ice. (One of the largest of these is the Ross Ice Shelf. As big as Texas, it is 500 by 400 miles wide.)

Our iceberg, as yet unformed, is buried within such a mass of floating ice, 1000 feet thick and moving seaward at the rate of one quarter mile per year. It will take about 2500 years to get there.

Many people think of an ice field as a white desert, without life, a place of almost perfect silence, perhaps of awful

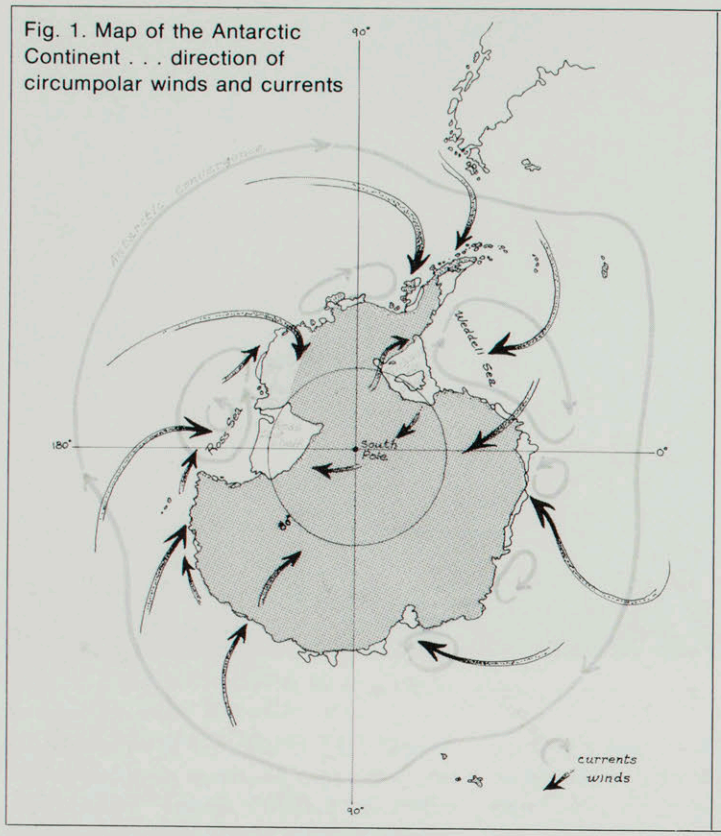


Fig. 1. Map of the Antarctic Continent . . . direction of circumpolar winds and currents

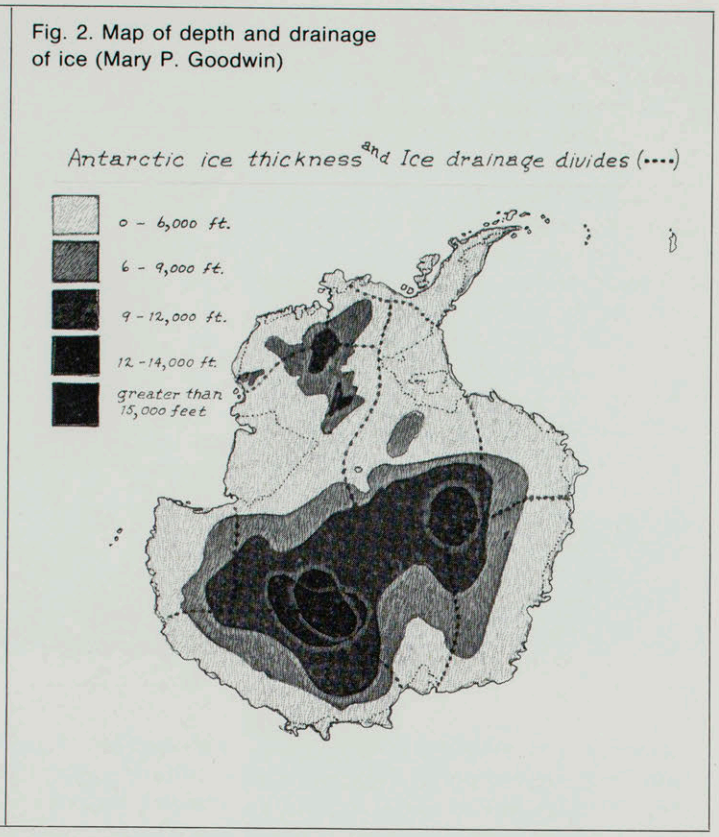


Fig. 2. Map of depth and drainage of ice (Mary P. Goodwin)

grandeur. Of life there is none. But a close look will show a variety of movement, fine details, and almost never complete silence. On an occasional day still air, diffuse daylight, and condensing moisture combine to form a 'white-out,' land and sky indistinguishable. But even then ice prisms, needles and columns and plates of tiny ice particles, move against one another with a glimmering sound. Crevasse systems develop as the glacier moves over and around the bedrock topography, upward pressure ridges tumble crumbling ice blocks against one another. Breakable crusts form during radiation, an iced popcorn surface may develop, meltwater races and potholes form, the water changing course and deepening to the lowest level. Wind redistributes the snow and glaze into long sastrugi. As air from the original snow layers escapes it hisses with an almost human sound. Deep rumblings come from far beneath the surface as the firn compacts. These readjustments of levels create earthquake-like shocks; the ice actually shakes. Ice may be as hard as steel or drift-like powder. It is coarse and granular, delicately laced, an ensemble of blowing, scouring, super-cooled drizzle, fissured. It is bridged with soft new snow. It is bare and blue or brilliant red under the short winter light. It will shatter like fragile glass or bend like rubber.

If we have dug an imaginary pit and stained the sides with ink, or taken a core of ice from a deep drill hole we can read the frozen history. The record of thousands of years of Antarctic climate fluctuations, sudden meteorological changes, past events of man, all are there. There will be density differences, disconformities of summer and winter layers. Ancient wind-borne snow shows as rounded compacted layers, hundred-year-old crusts are identified by old lines of condensation along the bottom, a fuzzy evaporation layer above. Precise cross-bedding tells of changing surface angles. Decayed layers of tiny particles reflect fallout from the Krakatoa explosion in 1883; the 1963 stratum accurately coincides with the eruption of Bali's Gunung Agung. If we measure the relic radioisotopes at the 1961-62 level we find the mark of thermonuclear tests. Interspersed will be veined grains of old morainic material carried from the slowly eroding mountain ranges. The embryonic iceberg buried within the ice moves toward the ocean reflecting all of yesterday.

At the junction of the continental and floating ice is a strand crack. Here the water-borne glacier begins. Small shelves fringe the continent. But within one of the two largest, the Filchner and Ross Ice Shelves, our incipient berg has still 500 miles to go. Travelling steadily now in its massive raft, it approaches its birth in the polar waters. With glacial ice added at the southern end and bergs calving in the North, the ice shelf maintains its shape and size although dramatic events do occur. The entire Polar Record Glacier, part of the Amery Ice Shelf, seems to have catastrophically calved at its landward hinge in 1964. The total area lost from the shelf was 10,920 square miles. The next year a state-sized tabular berg was spotted from the air, the same size *and shape* as the missing piece, and in the exact position where the currents would have directed it. Giant bergs of 300 to 400 miles long are often encountered near the coast, presumably the leading edges of the larger outlet glaciers, small shelves, or ice tongues. Ice shelves exist, flexing, supported by the coast, protected by the shores of large bays. They are rapidly destroyed at the leading edge as icebergs calve continually.

Shelves have a gentle rolling, crevassed, or level surface and a sheer outer edge. As in the far interior there is still no life, but petrels, amazingly, are sometimes seen flying south above them. No one knows why. Occasionally fish or seal remains appear on their surfaces, inexplicably. There are two theories

about this phenomenon, together with speculation about the ice balance at the bottom of a shelf.

Sea ice may adfreeze to the underside of an ice shelf, shallow water organisms may work their way through to the surface (Debenham, 1911). Radiocarbon testing has shown one mummified seal found far inland on the ice shelf to be 1100 years old! Another and more recent theory is that ice shelves melt on the underside, gradual heating occurs in the ice as it moves north and also with increasing depth within the ice. Since the water temperature underneath is always less than the shelf, heat may move up through the ice.

It has been a staggering number of years. Within this huge raft imperceptibly moving up and down on its hinge our iceberg is approaching the brink, finally about to be born.

Waves smash at the base of the wall of ice. Plumes spray high over the ice foot. Rumbling rhythms issue as the waves carve deep holes into the ice. Water cascades from the crenellated top. Linear wedges of ice lean out precariously, 150 feet high, unstable pickets, all that's left of ancient crevasses. The face of the cliff is a criss-cross of ice held together tenuously by the still-solid underwater part of the outer shelf. A deep crevasse works free at the back. It splits to the water line. In slow motion the mass of ice detaches itself. With a ripping roar it topples onto its side, sinking deep into the water. Up it slowly bobs, pushes deep again and reappears. It comes about, rights itself, rocking, pulsing, sucking at the frothing water. The behemoth slowly comes to rest in its own cleared ring. Old sea ice blocks rock on the perimeter of patchwork floes. Calving, the berg is an entity.

Now come the birds, from all along the barrier, petrels, fulmars, giant skuas, to feed on the fish and disturbed plankton. Life at the ocean bottom is also stirred by this enormous delivery. Dipping and wheeling, the birds gorge from the sea. Some come to rest on the new white giant, others fly to feed the downy young on nearby rocky coasts and low ice piedmonts.

Icebergs come in all sizes. There are towers, battleships, rooted molars, floating prairies. The two largest measured by the United States Navy were 100 miles long by 130 feet high, and the other 208 miles long, 60 miles wide and 130 feet high. The bergs calving each year in the Antarctic contribute about 520 cubic miles of fresh water to the Southern

Crevasse system of interior ice.
Photo by Eugene L. Boudette, U.S. Geological Survey

Ocean. As well, they add a tremendous amount of cold. Average berg temperature ranges from 50 to 75 below zero, whereas the water in the Antarctic is never colder than 28 F.

Unlike the icebergs of the Arctic which are usually calved from glacial snouts and have a cathedral-like shape, almost all of the bergs of the South are tabular. From above they are hatched with crevasses, from the side they are linear, and from below they are mellow, hollowed, pendulous. They may have projecting rams just beneath the water line, the result of wave action and often a hazard to the old wooden ships. Today's sonar and radar warn of bergs, their exact size and shape, even in the dense fog or winter darkness. Included within the icebergs is all that has slowly worked its way out from the interior of the continent. In at least two instances, remnants of Admiral Byrd's former camps have been seen. High on the side of one long berg were radio antennae, supply crates, and draped pieces of a tent—Little America buried and sheared in two and now, forty years later, drifting to eventual deposit on the floor of the sea.

The iceberg belongs now to the sea. It moves with the currents flowing westerly around the continent. In winter it will be immersed in the pack but not a part of it. The sea ice moves with the winds, generally easterly. The berg with its great depth is pushed with the current; it often seems to be sailing in the opposite direction from the movement of the pack ice. And so it may be, plowing a perverse swath, piling up crumbled hummocks into long trailing ridges. It will travel through dense fog where the cold and warmer currents meet. It will drift slowly through open water pools called

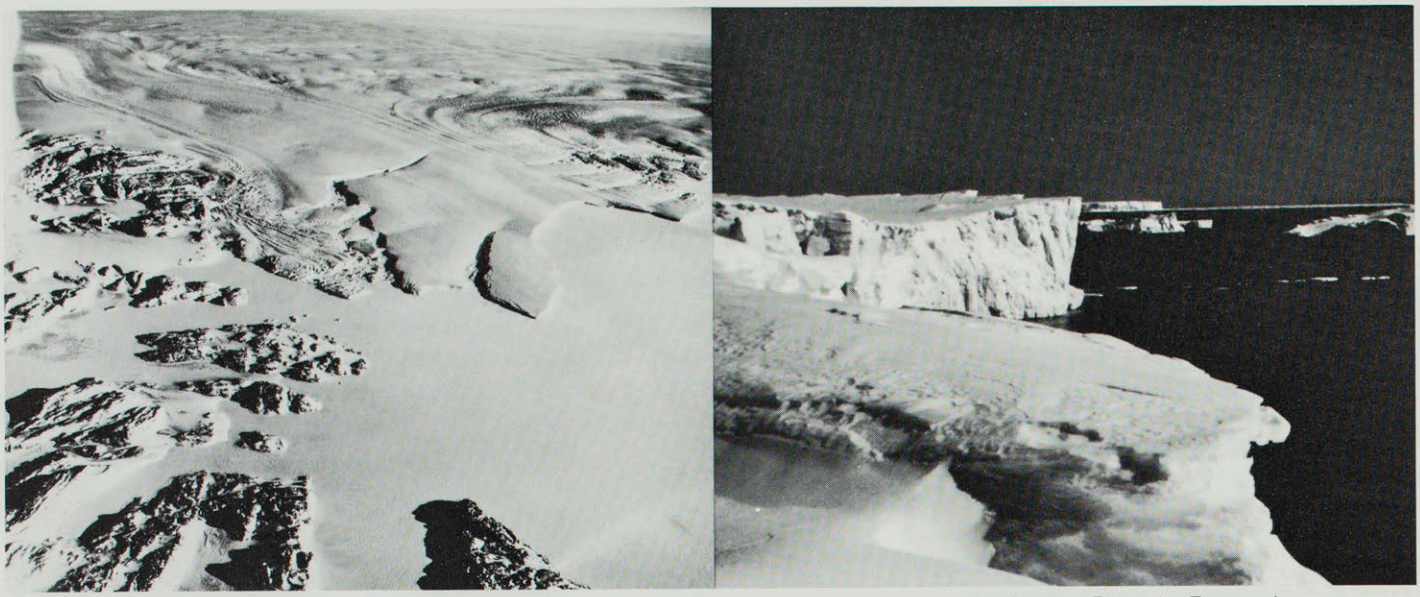


Fig. 3. Edge of the Continent showing ice movement and berg almost at the moment of breaking. Anare photograph by "Aerial Photograph" Ice Barrier. Photo by Eugene L. Boudette, U.S. Geological Survey.

polynas. It will cluster with other bergs subject to the same force. It may become embayed, grounded, dig into permanent harbor, then careen and subside into a pile-up of shore ice.

Salt leaches slowly through older bergs until the slush at the top is quite fresh. This was a frequent source of drinking water in the heroic days of exploration. A tiny wooden ship would anchor with a 'deadman'. All hands scattered with buckets and shovels, lined up, and resupplied the ship with clean ice to be melted in great barrels in the primitive galley.

Dark bands of rock dust hasten the uneven melting. The berg will tilt at a crazy angle, a white cuesta in a dark green desert. It is carved and polished by the wind, sculptured at the water's edge into gutters and caves. Eventually it collapses on its side or overturns and the process of attrition starts again. When a berg rolls over you have a grand view of what has been happening far below, eroded ice, up-ended strata, lovely red and purple streaks of the ice algae, and, if the berg has been long in shallow water, all the inclusions gathered into the ice from the bottom gravels.

If the berg moves with the pack circling to the north it makes its escape from the Antarctic. Reflected now in deep blue waters, it melts into a gently domed shape, divides into mini-bergs; circling and weathering irregularly they become a congregation of 'bergy bits' and the white mountain is gone.

Our iceberg, however, remains close to the coast. In the glittering sunshine of summer, birds circle it and penguins march along its precariously jumbled ice foot. In gangs they dive and porpoise. Weddell and Ross seals are below too. As the winter darkens all but the great emperor penguin leave the Southland, rafting north on the old sea ice to feed in the rich plankton-full waters of the Antarctic convergence. New pack ice freezes heavily around the berg. Seals gnaw the edges of their breathing holes. During the long night an occasional emperor passes on his way to an open lead to feed. He returns, alternately walking and tobogganing. On the shore rookery he will relieve his mate in their wintry process of incubating a single egg.

In the spring the tiny Wilson's Storm Petrel returns first. Other flying birds, raucous, throaty, mottled Cape pigeons, ugly giant petrels. And then, homeward bound Gentoo and Adelie penguins line the distance with dots across the pack ice. Bull sea elephants herd their snuffling harems to shore. The ice tower has softer contours now. It is smaller and listing badly. Disguised with windward and leeward snowdrifts it is brilliant pink in the low lying sun. Turquoise ledges and weathered rams sparkle below a deep wave cut. Now as the sea ice releases it, the berg moves out of its small bay, in again, and out; moves west along the coast into another haven. Its shape and girth have changed. As its depth diminishes it moves less surely with the currents, vacillates and slows. Once again in the fall it is fast in sea ice and takes up a position below towering black rocks newly capped with snow. Larger, newer bergs pass by, cleaving the pack.

At the beginning of the third summer the giant is fragmented, sunk at angles. The several bergy bits are milling the rotten sea ice, eddying free under the returning sun, higher each day. They roll about, awash, lower each day in the water. They are the smallest glacial remnants now, 'growlers'. Their tops are pooled with meltwater, thin streams score their slanting sides. They are blue and green and gold during the lengthening day, violet or scarlet in the short nights. Here rest sleeping seals, and Adelie penguins escaping the dread leopard seal stand watchfully.

Sunlight glances. A sleek steel ship's bow softly bumps. The penguins hurriedly dive off, the seals only raise their heads as the great hulk glides by. In a month of circling, drifting, melting, fragmenting, the growlers become brash ice. The iceberg is gone, vanished in a froth of fragile slush, tossed by the smallest wave.

Mary P. Goodwin has written travel articles and essays for children about the Antartic. Her passion for that icy world is apparent in this poetic article, her first, for TERRA. She is a well-known medical illustrator and the drawings and charts are her own.

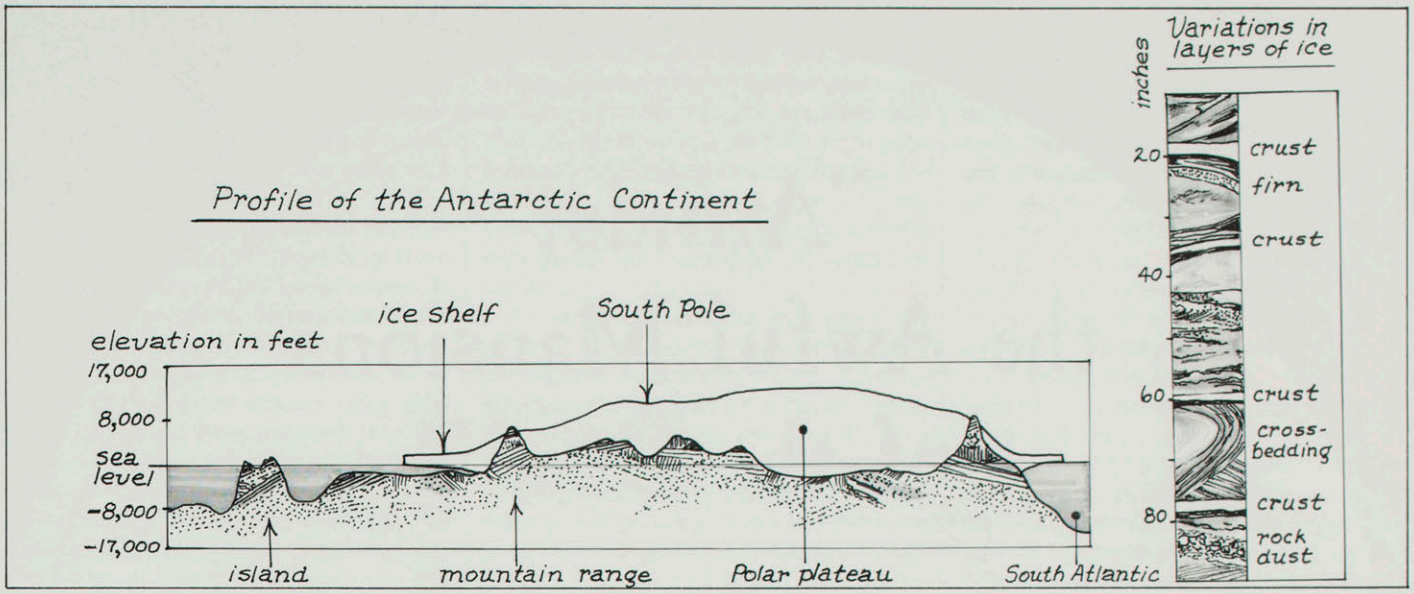


Fig. 4A. Continent . . . saggital

Fig. 4B. Interior of ice cross section, stained (Mary P. Goodwin)

Fig. 5. Layered ice cliffs . . . ANARE photography by "A. Campbell-Drury"

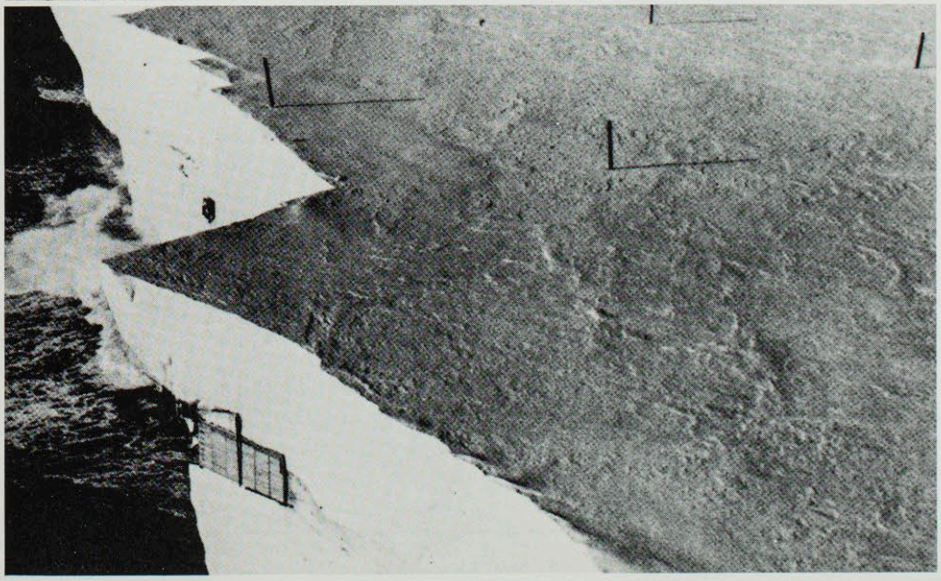


Fig. 6. Helicopter view (1963) of iceberg containing remains of Little America III (1939), 300 miles at sea. Photo by U.S. Navy

Growler . . . with Underwater Ram (Charles Swithinbank)

"Amidst the Awful Mansions of the Dead"

by **Gretchen Sibley**

Snow capped peaks of the Hindu Kush rose against a brilliant blue sky to the south and before us the brown rolling mountains, sparsely covered with only the small plants which grow at eleven thousand feet. The track we were traveling curved around a small hill to find three nomad tents stretched out against the hillside, a number of sheep and camels grazed on the rough ground. A few yards away two women knelt over an arrangement of rocks. Here in this lonely spot in Afghanistan was a cemetery and the women were visiting a newly dug grave. Bodies are buried, head to the north, feet to the south and the body laid on its side to face Mecca. The ground is formed into a small mound over the grave, unhewn native stone outlines the mound and a rock is placed at the head and feet, parallel to the body if it is a man, facing it if it is a woman. The only addition to such a grave might be a tall branch bearing a colorful flag, indicating a murder victim!

An integral part of life is death, and man's reaction to this down through the ages makes a fascinating history of the thinking of man and the development of religion and culture. The lonely primitive graves on the remote mountain of Afghanistan took us back to some of the earliest burial practices known to man.

There is little doubt that during the early history of man there was no burial. The dead were probably left to vultures and wild animals. Even in central Asia a few centuries B.C., the burial or burning of dead bodies was prohibited by the teaching of Zoroaster. Bodies were left in certain areas called *Dakhmas* to be ravaged by wild dogs and vultures. Today this practice is found among several peoples. For instance, burial is impossible in the permafrost of the arctic, and elderly Eskimos desert the family to go out alone and wait for death. Certain African tribes such as the Masai and the Ik follow the same pattern.

Nor were bodies always consumed by birds, wild animals and assorted small animals addicted to decaying flesh. Since cannibalism has been a habit of many primitive peoples, it undoubtedly played a part in the practices of ancient man. Feeding upon one's fellow man is sometimes the result of an urge for fresh meat. But certain esoteric values made the practice a religious and ceremonial act. Rarely is cannibalism a form of burial but often only parts of the body are eaten and the rest buried. The eating of human flesh may be an attempt to partake of the physical or mental strengths of the deceased. At times parts of murder victims are eaten to keep the mischievous ghost from returning to plague the living.

Australian aborigines dry-smoke the bodies of their dead and drink the remaining liquids. And in warm countries where the body will decay before long rituals come to an end, liquid putrefaction will sometimes be wiped up and eaten by sorrowing friends and relatives. Certainly such practices are abhorrent to us, but often have deep-seated religious significance to the people involved. Today cannibalism is rare, but is still known in remote areas in the South Pacific and Africa.

At some time in ancient days man began to bury his dead. Perhaps closer family ties and the culture of agricultural people led to more concern for the sick and dying. Burial was simple but varied among different peoples. The body was usually arranged in a crouching position, sometimes sitting upright and sometimes on its side. Gradual refinements were added: the body might be wrapped in cloth, grass or reeds, sometimes it was put in a large pot or wooden container and buried in the ground or placed in a cave. In time small objects belonging to the deceased were dropped into the grave, perhaps evidence of the first belief in life after death.

The next stage was tomb-building. The burial hole was lined with rough stones, and slabs of stone were laid over the body. The Bongo tribe of southern Sudan still follows this pattern, building a vertical shaft for the body and burying wooden figures carved to a representation of the dead. Ancient stone tombs have been found in many places in the world. In Cyprus the pits were dug under the floors of houses and many stone vessels, ornaments and tools were also buried. By 800 B.C. the Assyrian empire followed the same practice, but used stone coffins and placed them in the cellar. Apparently the belief in life after death soon became well established, judging by the variety of objects buried with the dead to keep them occupied beyond the grave.

Similar tombs were found all over Europe. But the pattern became far more complex. Through Portugal, Britain and Denmark, passage tombs were constructed and lined with stone. Long passages led to crypts in which one or more bodies were buried. During the Bronze Age in Sicily, large rock-hewn chambers for multiple burial were cut into the face of huge rock cliffs. Shaft tombs were constructed in Pre-Columbian Central and South America. An excellent example can be seen in the Museum's Pre-Columbian hall. A vertical shaft was dug to open into a large chamber at the base.

In some countries bodies were buried until the soft parts rotted away. The bones were then dug up, cleaned and buried. Certain South American tribes would use this process if a person died far from home. In early Crete the bodies were boiled and the bones thrown into a bone pit. This bone-cleaning became an unbelievably elaborate custom in Rome between the 16th and 19th centuries among the Capuchin fathers at the Church of the Immaculate Conception. About 4,000 Capuchin fathers died during this time, were buried and later the bodies disinterred. The bones were used to form intricate designs on walls and ceiling. Skulls and shoulder blades formed altars, mummified bodies lay encased in robes on beds of leg bones, while walls and ceilings were festooned with garlands of vertebrae, ribs and arm bones.

Ancestral bones were well cared for in Asia. As one drives through the New Territories near Hong Kong, unusual structures are seen in the fields. These are tombs, built in the shape of a woman's womb to carry the concept of the return to the womb at death. A small door in the center permits the family to enter, remove jars of bones once a year, clean the bones and return them to the tomb. These misplaced families hope to return to the home of their ancestors, carrying the bones of their dead for permanent burial.

Ancestor worship in China resulted in elaborate rituals, richly decorated tombs and faithful care. And such care insured good luck for the living. Ancestor worship and hero worship have not been rare in the history of man. Men and women of great stature, political power or supernatural power were thought to be raised to new heights of power after death.

Thus far we have been occupied with the burial of bodies. But burning has always been an effective way of disposing of the dead. Ancient man sometimes cremated his dead and the practice gained popularity through the years until it became the predominant method of disposal of the dead in most of the ancient empires around the Mediterranean, except in Egypt.

Without doubt, the remains of bodies of very early man indicated that the bodies had been burnt. Sometimes partially burnt bones have been found without apparent burial. Gradually these bones or ashes were buried in pots placed in simple graves or the ashes were scattered and sometimes drunk in a liquid. In Greece, cremation and accompanying ceremonies and ritual became quite elaborate. Homer describes a number of these funerals, for instance, that of Patroclus, companion of Achilles. King Agamemnon ordered logs to make the funeral pyre and the body was borne in a great procession of thousands of men led by armored soldiers in chariots. Each man cut and dropped a lock of his hair to cover the body of Patroclus. When the body was laid on the pyre, Achilles cut his own yellow hair and placed it in the hands of his dead comrade. Great logs were stacked high and covered an area of one hundred feet around the body. Many sheep and oxen were flayed and dressed, the fat removed and placed on the dead man's body, while the remainder of animal bodies was heaped about Patroclus. Jars of honey and unguents, four horses, two house-dogs and twelve sons of noble Trojans were all sacrificed to the pyre which burned throughout the night while mourners watched. The fire was quenched with red wine, the bones collected and laid in layers of fat in a golden urn. A mound was raised upon which the urn was placed. Presumably this was usually the end of the funeral but Achilles put on a sports event including chariot races, boxing, wrestling and archery. While this story is a legend, it is a good description of burial practices.

Ceremonies surrounding cremation also became elaborate in Scandinavia during pre-Christian days. Ship burial was popular for many years. A ship was pulled up on land, the corpse was laid inside and clothing, furniture, ornaments and arms were placed on board. The boat was then burnt on land as a funeral pyre or set afire and launched to sail out to sea.

Embalming was first practiced in Egypt. It seems to have been a logical step from natural mummification which would occur when bodies were buried in hot dry sand. The life-like appearance of such bodies led people to believe in a life after death and they began to leave offerings in graves for use in the afterlife. In large graves, the heat did not penetrate and the bodies decayed. And the first embalming was attempted.

During the third and fourth dynasties, the bodies were flexed and buried in simple coffins. The deceased were then covered with natron (a combination of sodium chloride and sodium bicarbonate—salt and baking soda) and wrapped in bandages. In later years the bodies were buried flat, the internal organs removed and the cavity filled with linen and resin. The outside was covered with resin-soaked linen on which facial features were painted. Bodies so prepared were called mummies, from a Persian term meaning wax or asphalt. However, Egyptians never used pitch or asphalt in their embalming.

It was during the New Kingdom, 1570 to 1080 B.C., that the elaborate 70-day process of mummification was developed. During this time the brain was

removed through the nostrils and all the viscera removed except the heart which was considered the seat of the mind. The body was then folded into a large jar containing either natron or a salt solution which would dissolve away the fat during the next few weeks. The head, hands and feet were protected from the solution. After removing the body from the jar it was straightened and dessicated and the body cavity packed with preservatives. Even the skin was packed to preserve the natural form and contours. A paste of resin, fat, cedar oil, etc. was spread over the body and it was wrapped in linen. The internal organs were placed in canopic jars and protected with honey and other preservatives. The mummy in our museum is displayed with four of these jars. In later years the organs were wrapped in linen and buried with the body. Decorative designs were painted over the body and hieroglyphics identified the individual and related important biographical information. The body was placed in a nest of coffins, at least one in the form of the body and another of wood or stone, both elaborately decorated.

Egyptians also mummified animals such as cats, dogs, bulls, birds, crocodiles and fishes. These usually had religious significance related to their gods.

The graves of kings became great works of art. In the Valley of the Kings at Luxor the tremendous underground graves were begun at the coronation of a king. Apparently the size depended upon the length of the reign. The largest grave covers 3,000 square yards. The large central passage extended into the hills and numerous rooms were excavated on either side. Walls were covered with paintings and hieroglyphics praising the pharoah and recording his achievements. Today these are still bright and clear, protected from the elements and kept dry by the desert heat. Food, wine, clothing, jewelry and all kinds of articles used by the pharaoh were buried with him. Even servants were included! Since most graves have been thoroughly raided, most of this material has disappeared, but the undisturbed tomb of King Tutankhamen has given us a picture of the burial customs and life styles of his times. Associated with the burial of a king were great processions, ceremonies and rituals to insure the awakening of his senses in the afterlife that he might enjoy life as he had before death. All of this created an illusion of magic and power. Mummies were stolen, ground to a powder and sent to Asia and many European countries during the middle ages to be used as a medicine. Powdered mummy seems to have won a fine reputation as a cure-all. Even today there is a small and steady demand for this rare medication in Asia. This might be considered another form of cannibalism.

Egyptian embalming arts were probably carried to nearby countries. While the process was never as elaborate, the bodies were often well preserved and buried with personal belongings, concubines, grooms and everything necessary to insure pleasure and comfort in the next life. During the time of Herodotus, the tomb of the king of Scythia was adorned with fifty horses and fifty young men stuffed and mounted in a circle.

Centuries later in the western hemisphere, the Incas engaged in burial rites which paralleled those of the Egyptians. Natural mummification was used in the hot dry climate and the practice of evisceration aided in this. Bodies were sometimes coated with a preservative and wrapped or sometimes skinned and preserved. Along the coast large communal graves were used, but in the highlands burials were in tombs and during religious festivals to the dead, the bodies of important persons were carried in processions.

With the spread of Christianity certain changes began to take place in Europe and all countries touched by Christianity. The belief in the resurrection of the body brought a stop to cremation. Embalming then became necessary and followed the pattern used in Egypt. Bodies were eviscerated and preserved with wines, herbs, wax and tar. It was not until the 18th century that embalming by injecting preservants into blood vessels was introduced. Religious ceremonies were simple and bodies were buried in plots of ground called cemeteries, an early Christian term meaning *sleeping place.*

Heart burial became common in Medieval Europe. Kings such as Richard I, Henry III and Edward I had their hearts buried in religious centers. The hearts of all deceased members of the Hapsburg family have been buried in the Loretto Chapel in Augustiner Kirche in Austria. Shelley's heart is buried in Bournemouth, while Thomas Hardy arranged to have his heart deposited in the grave of his first wife. The heart and viscera of the Popes have been buried in the parish church of the Quirinal since the 16th century.

During the middle ages burials were made in churchyards. Tier upon tier of graves under mounds of earth threatened to rise up to cover the windows. Embalming did not hold up in damp climate and disease was spread to churchgoers, visitors and run-off waters. It was time to move back to the cemeteries.

Cemeteries were to remain simple for many years in Europe. Even in early America small cemeteries near towns and villages were fenced-in areas covered with simple headstones. Those in New England have been of great interest because of their simple direct epitaphs characteristic of the blunt New Englander. Who could not be impressed by such gems as:

Here lies our darling baby boy
He never crys or hollers
He lived for one and twenty days
And cost us forty dollars

Molly tho' pleasant in her day
Was suddenly seized and went away
How soon she's ripe, how soon she's rotten
Laid in her grave and soon forgotten

He that was sweet to my repose
Now is become a stink under my nose
This is said of me
So it will be said of thee

Under the sod and under the trees
Lies the body of Jonathan Pease
He is not here, there's only the pod:
Pease shelled out and went to God

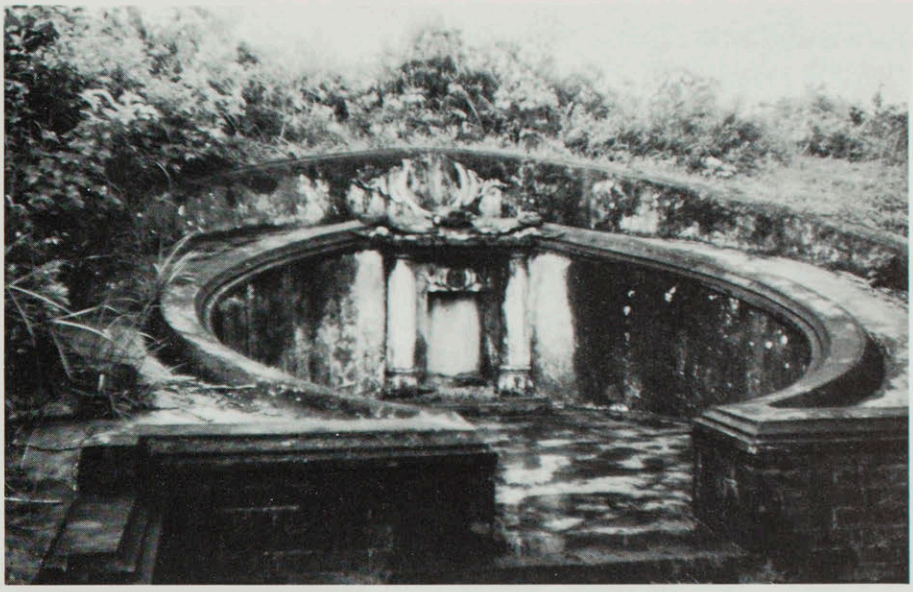
But simplicity was not to continue. Perhaps the inspiration of a Taj Mahal or ornate Siamese memorial *chosen* sparked the imagination of ambitious business men and induced them to play on the emotions of grieving families. The result is great gardens and parks dedicated to the dead with fountains, colored lights, great statuary, chapels, soft music and astronomical funeral expenses—a new cult of the dead. Valuable ground is filled with well preserved bodies to frustrate nature devoted to recycling.

Even pets have not escaped. A visit to a nearby pet cemetery is an interesting study in human nature. We share a few gravestone inscriptions:

Cuddles. Altho in silent sleep
We love you

Cheekee – Mama's little angel baby
Always and forever with me

Miss Jennifer – Little Miss Perfect
our girl
Always yours in love



Chinese family tomb where bones are buried in jars. The tomb, in the likeness of a womb, indicates a return to the womb after death.

Photos by Gretchen Sibley

Reklaw Sass'em Jane "Sweetheart"
Our Treasure – mother's baby

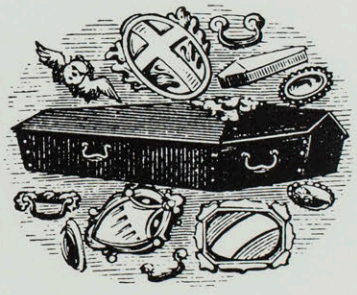
Jet – Knowing him is love forever
God will never make another

It is time to re-evaluate our attitudes towards life and death and the disposal of the deceased.

"Beneath the sacred honours of the tomb
In awfull silence and majestic gloom
The man of mercy here conceals his head
Amidst the awfull mansions of the dead.
No more his libral hand shall help the poor
Relieve distress and scatter joy no more."

From a gravestone,
Brattleboro, Vermont

THE END



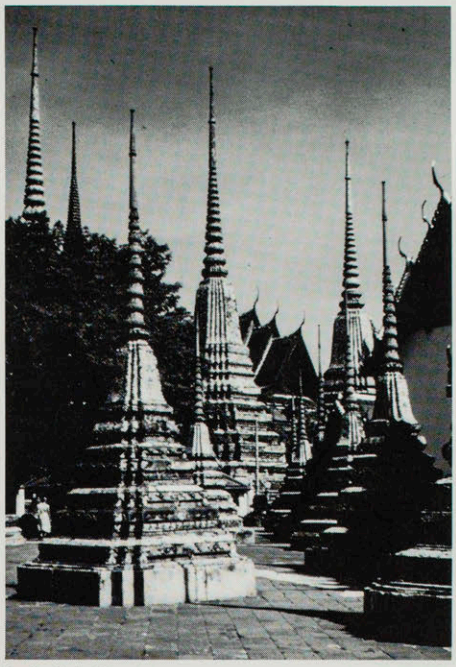
Gretchen Sibley, Education Specialist at the Natural History Museum of Los Angeles County, has been interested in burial customs since 1955, when she first visited Peru. She is the author of numerous books and articles and her essays for TERRA generate much fan mail.

Flags mark the graves of the murdered in this lonely graveyard in the remote mountains of Afghanistan.

Broken pottery mingles with the bones of the dead in an ancient shaft tomb, Monte Alban, Oaxaca, Mexico.

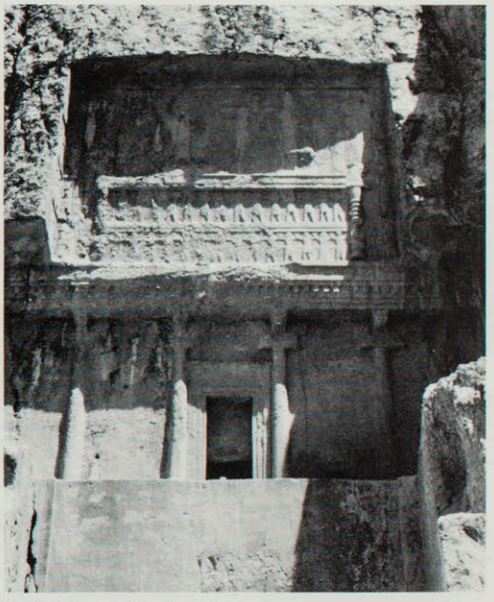
New England graveyard.

The Pyramid Tombs of the Pharaohs rise from the sands of the Saharas.

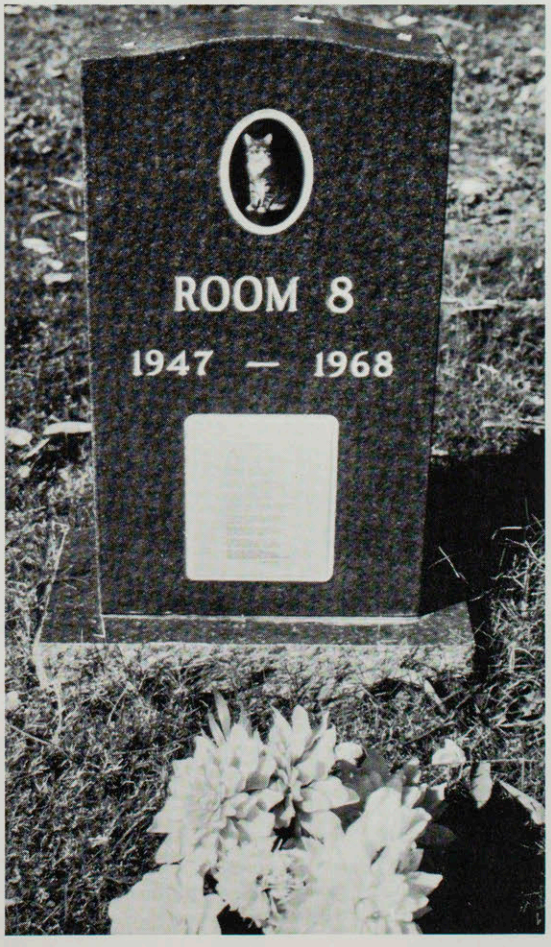


Colorful *Chosen* commemorate the great rulers of Siam.

Africans sometimes place wrapped bodies in trees to escape wild animals.



Darius I was buried close to Persepolis, one of his palaces of the Persian Empire.



"Room 8," the faithful cat of an elementary school, is remembered at a pet cemetery.

The gaily painted mausoleums of a Guatemalan cemetery (photo by Dorothy H. Seligman)

New caskets are carried to Guatemalan markets.

ETHNIC ARTS SHOP

Graphics and Growing Things

Originals by:

Picasso	Henry Moore	Ortega
M. C. Escher	Siqueiros	Friedlander
Miro	Ben Shahn	Peter Max
Buffet	Appel	R. C. Gorman
Dali	Calder	Rauschenberg and many others $15 to $5,000

Plants in hand thrown pots, shells and terrariums $5.00 to $50.

The Battle of San Pasqual, December 6, 1846, one of twenty dioramas in the Museum California Hall. (L.A. County Museum photo)

KEARNY AT SAN PASQUAL

by **Konrad F. Schreier, Jr.**

A little east and a bit south of Escondido is the San Pasqual Valley, one of the many handsome agricultural areas of California. In 1846 this little valley was the scene of important events that helped to make California a part of the United States.

In 1846 the United States went to war with Mexico. A few American military units were present in California, but an additional contingent of U.S. Army troops would be required to support a takeover from Mexico. To bring this about, General Stephen Watts Kearny was ordered to lead his First Dragoons across a thousand roadless miles from Santa Fe, New Mexico, to California.

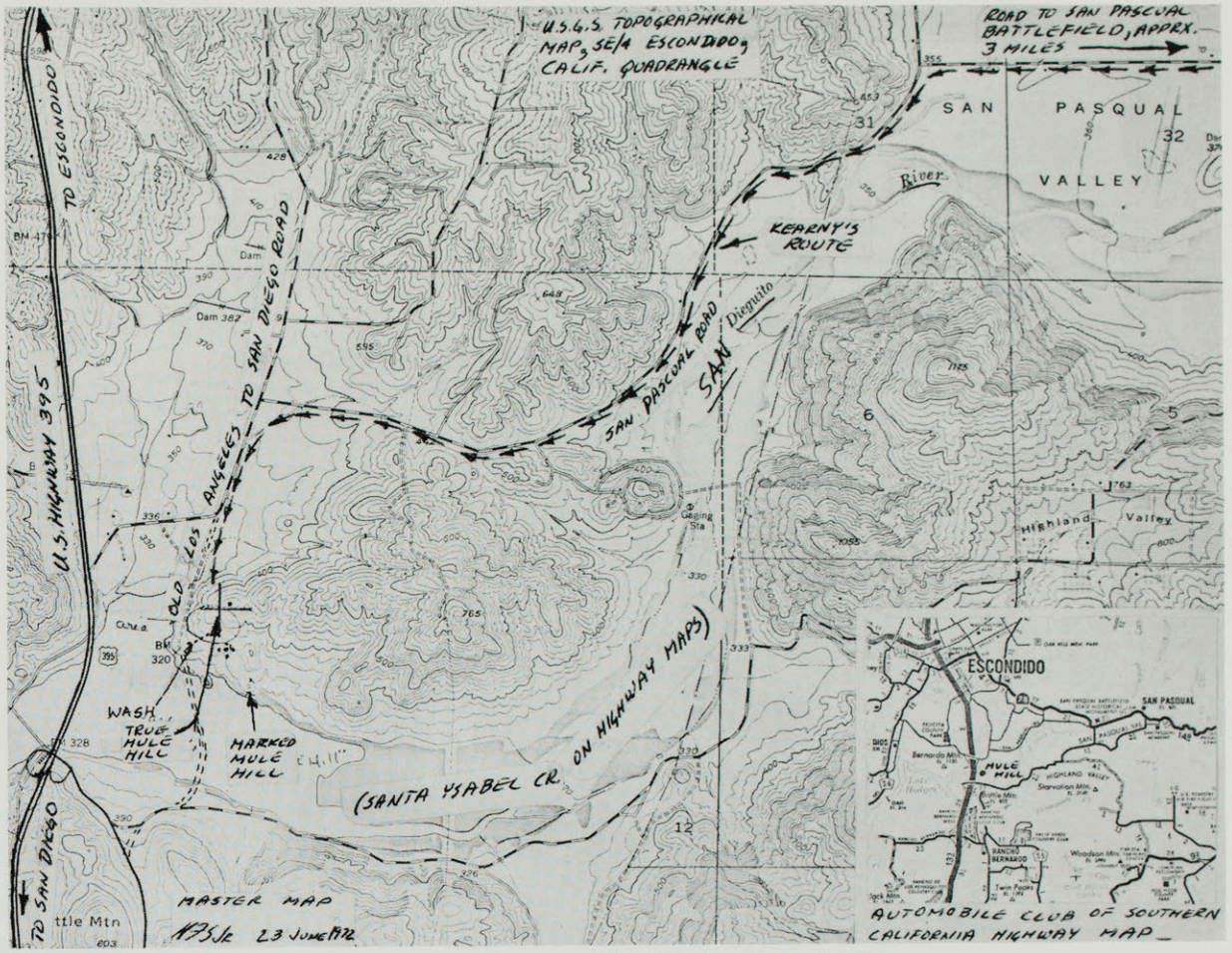
On September 25, 1846, Kearny left Santa Fe with three-hundred men, a mule-drawn wagon train, and two small field guns. Progress was painfully slow, since the Dragoons had to build a wagon road as they traveled. On October 6 the Kearny Column met scout Kit Carson and 15 men carrying dispatches east from California. Carson and his men reported the Far West was eager to join the Union.

Digesting Carson's intelligence, Kearny concluded it was no longer urgent for his entire force to get to California. He, therefore, reduced his command to a size which could more easily make the long march. A hundred of the best dragoons and horses were selected to continue. Half the mules were taken from the wagon train and turned into a supply pack train. Two little mule-drawn field guns stayed with the Kearny Column. While the surplus dragoons and wagons were sent back to Santa Fe, the protesting scout, Kit Carson, was ordered to lead the column to California over the route he had just traversed.

By the time the Kearny Column crossed the Colorado River at Yuma on November 22, the wear and tear of the long march over the dry desert trails was beginning to take a toll of men, animals, and equipment. But spirits were high, and on the second of December the column completed the difficult march from Yuma, across 125 waterless miles of the southern Imperial Valley to Warner's Ranch in the San Ysidro Mountains. This was the most arduous part of the trek, and even the limited water, food, forage, and shelter found at Warner's Ranch were a great relief for the tired men and animals.

At Warner's Ranch Kearny learned that California was not completely in American hands, and that a force of hostile native California lancers blocked the route to San Diego. Despite the dilapidated condition of his men, animals, and equipment, Kearny determined to find and engage this enemy force, believing the high morale of his men and the element of surprise were all he needed for victory.

On December 4 the column marched thirteen miles in the rain, to Rancho Santa Isabel, and on the fifth they marched a few miles further to Rancho Santa Maria. The confidence of the entire Kearny Column rose with the prospect of action, though animals were exhausted and equipment was crumbling into uselessness. Late in the evening of the fifth, about forty men from Commo-



Map of Mule Hill region with inset map of the Escondido—Mule Hill—San Pasqual region.

dore Stockton's force in San Diego reached Kearny at Rancho Santa Maria. Led by Marine Corps Captain Archibald H. Gillespie, with Navy Lieutenant Edward F. Beale, they brought news that the California force was just nine miles west at the hamlet of San Pasqual. The entire Kearny command, now some 160 men, including the reinforcement from San Diego, was itching for action. The order was given for a night march on San Pasqual.

They marched for hours in a drizzling rain over rough mountain trails. Early on the morning of the sixth of December the command reached a point in the brush-covered mountains southwest of San Pasqual, overlooking the valley. Shortly before dawn Kearny set his force in motion, moving down the mountainside to attack the California lancers at first light. In the lead were Captain Abraham R. Johnston and the twelve best-mounted dragoons, followed at a short interval by fifty more dragoons—all who could be mounted on battleworthy horses—led by Captain Benjamin D. Moore and Lieutenant Thomas C. Hammond. Kearny led the remainder of the attack force, including the two little field guns. The mule pack train with a few guards brought up the rear.

No sooner was the charge sounded than things began to go wrong. As the bedraggled dragoons hit the valley floor they became separated, their jaded horses unable to hold an even pace. Weapons would not fire because the charges were damp. Someone had neglected to order the men to reload before going into battle. The two field guns were unable to go into action because their mules tried to stampede with the first excitement.

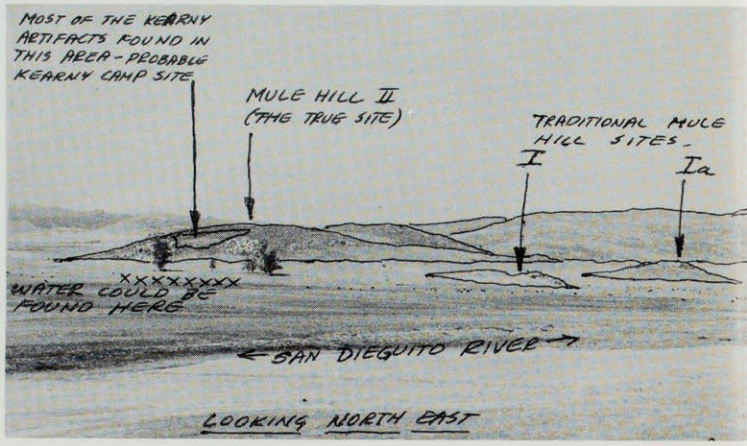
Then the magnificently-mounted lancers hit the scattered dragoon charge in the flank, wreaking havoc with their homemade lances. The fight developed into a series of individual combats, and the Kearny force lost the initiative. In a few minutes the Californians inflicted more than thirty casualties, mostly from lance wounds, losing only a couple of men in the process. Then, apparently fearing the American force would quickly recover and strike back, the Californians withdrew from the field.

The Battle of San Pasqual left Kearny's troops in no condition for a counterattack. Eighteen Americans were dead, including Captains Moore and Johnston. Several others were mortally wounded, including Lieutenant Hammond. Kearny had suffered painful and disabling lance wounds, and the entire command was distraught at the repulse. Still, the Americans retained possession of the battlefield, just a couple of hundred yards southeast of the present San Pasqual Battle monument. They buried the dead nearby. Late in the afternoon the battered Kearny command encamped on the hillside just west of the present battle monument, while the lancers hovered about, just out of gunshot range, taunting the Americans.

Early on the morning of December 7 Kearny set his force back on the march, realizing his best chance lay in reaching San Diego. He moved west on a trail toward the Los Angeles-San Diego road,

One of the prime clues which inspired the investigation of Mule Hill was a series of artifacts in the hands of private collectors. These all came from Mule Hill II, and can be identified as dating from the correct historical period.

Mule Hill seen from the southwest. Hills I and Ia have been suggested as sites of Mule Hill, but no contemporary artifacts were found in either place. To the left or west of the other hills is Mule Hill II, where the contemporary artifacts were found.


MOST OF THE KEARNY ARTIFACTS FOUND IN THIS AREA - PROBABLE KEARNY CAMP SITE
MULE HILL II (THE TRUE SITE)
TRADITIONAL MULE HILL SITES -
I
Ia
WATER COULD BE FOUND HERE
SAN DIEGUITO RIVER
LOOKING NORTH EAST

following the approximate line of the secondary road that forks south from present State Highway 78, just west of the San Pasqual Battle Monument. As the Kearny force moved south, fatigue began to overcome the men, and the animals were fast approaching a state of collapse. The Californians stayed so close that moving the 13 wounded became a very dangerous business.

Late in the afternoon a brief skirmish occurred near a hill with good defensive possibilities. Dragoons mounted on the few serviceable horses chased a few lancers off the hill, and the rest of the American column straggled into camp. Soon Kearny had his men arranged in defensive formation on what has come to be known as Mule Hill, just a couple of hundred yards north of the ford across the San Dieguito River, along the old Los Angeles-San Diego road.

The exact location of Mule Hill is a confused point. Information published by the late historian, Dr. Owen C. Coy, and by Dr. Arthur Woodward, longtime curator of history at the Los Angeles County Museum, identified Mule Hill as a small knob on the south side of the San Dieguito River. This location was based on maps and local tradition, but there are several good reasons for believing that a larger westerly hill is the correct site.

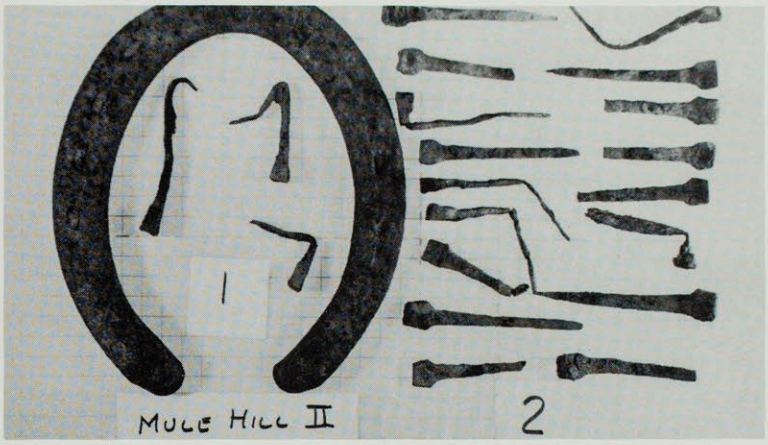
From the viewpoint of the Kearny Column the large hill would have completely hidden the small knob to the south; therefore, the large hill would have been the only logical choice. Moreover, it is extremely doubtful that the Kearny force could have marched down the marshy valley of the San Dieguito River that wet winter of 1846, though this is the only other practical route they could have taken to Mule Hill, and the only one which would have taken them to the small knob south of the big hill. One other argument in favor of the big hill is that the small knob is of such minute dimensions that the remaining men, with their animals and baggage, could not have camped there without almost literally standing on top of each other.

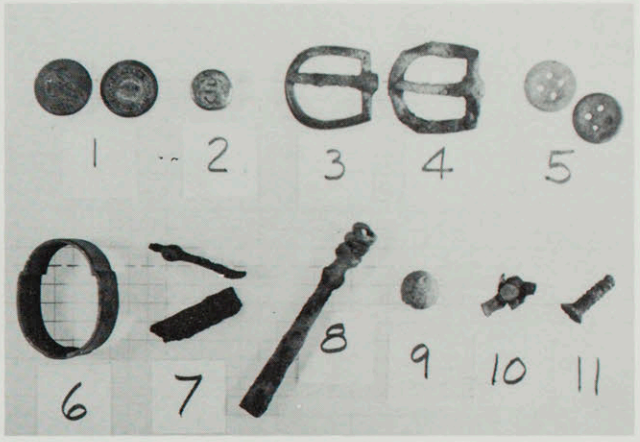
With the above evidence in mind our Museum's History Division decided to make an investigation of the Mule Hill site. It was a joint effort under the direction of the author, with the guidance and support of then acting chief of the History Division, Russell E. Belous. The decision to carry out this investigation arose from information obtained through Mr. and Mrs. Cloyd Sorenson and the late Col. Berkely R. Lewis of Vista, California. Aerial photographs made on training missions by the U.S. Marine Corps 3rd Air Wing, as well as topographical maps, appeared to confirm our initial impressions about the route of Kearny's march and the "big Mule Hill" location. A historical-archaeological study of the hills was the next logical step.

While they were camped on Mule Hill, the Kearny force had burned everything the exhausted men could not actually carry away. It was believed the remnants of this burned baggage would be found on the true site of Mule Hill. The name of Mule Hill arose from the fact that Kearny's command butchered several

One of the teams of U.S. Marine Corps engineers with mine detectors.

Although the horseshoe is undatable, the horseshoe nails are all of a pattern used in the 1840's. Only one horseshoe was found on Mule Hill II; however, twenty antique horseshoe nails were found there.





U.S. regulation equipment buckles found on Mule Hill II;

pack animals there; some remains might be found. Local people told us they had found likely bits and pieces of equipment on the big hill, and this made it all the more worth a serious investigation.

Two days were spent going over the hills in question. Since most of the remains of Kearny's burned equipment would be metallic, we asked the Marines to help again by lending trained men from the 5th MEB Engineers with mine detectors. When the hills were swept with the mine detectors, the small knob and another small hill next to it yielded only modern metal bits, mostly old metal heads from hunters' shotgun shells, none of it buried more than six inches below the surface. Nothing which dated from Kearny's time was found on either of these locations.

We then moved them to the big hill, which we believed to be the true Mule Hill. Within minutes we began to find interesting items. Two hundred and two artifacts were found on the big hill, 105 of which were probably from Kearny's burned baggage. Many pieces came from old saddles, but the most interesting were: an iron spur, U.S. regulation, of a pattern not used after 1851; one complete U.S. horse bit, and the side bar of another like it, of a pattern which had officially gone out of service before 1846; and four U.S. regulation buttons of the designs used in the 1840's. The efficiency of the Marine mine detectors was proven when they found two broken saber blades buried under the remains of a fire, and well over a foot beneath the surface. As a result of these finds and of our study of the terrain, it is our belief that the big hill is the true Mule Hill.

Kearny's beleaguered little command spent nearly four days on Mule Hill. On the eighth Kit Carson and Lieutenant Beale slipped through the Californian lines to bring help from San Diego. Two days later, with no word from these messengers, Kearny prepared to resume the march. Suddenly, just before dawn on December 11, 1846, Kearny's Mule Hill Camp outposts made contact with the relief column from San Diego. By sunrise, the Californians had fled. The two-hundred-man relief force fed Kearny's command, and after a short rest, they all marched to San Diego.

A couple of weeks' rest in San Diego—in 1846 a small town located immediately around what is now known as Old Town—put Kearny's First Dragoons back into action with more than half of the original force. In one sense a minor action, the Battle of San Pasqual was nonetheless the largest pitched battle in California during the Mexican War.

Konrad F. Schreier, Jr.
Research Associate
History Division

Konrad F. Schreier Jr. is Research Associate in Military History at the Natural History Museum of Los Angeles County. He is author, lecturer and consultant in military and technological history. This is his second TERRA article.

Natural History Museum
Exposition Park, Los Angeles, California 90007
Address Correction Requested

Non-Profit Organization
U.S. Postage
PAID
Los Angeles, California
PERMIT NO. 13945

MR & MRS NORMAN LORETZ
1600 ADDISON RD
PALOS VERDES EST, CA 90274
SH10

LOS ANGELES COUNTY NATURAL HISTORY MUSEUM

DR. GILES W. MEAD, Director
CHARLES F. GEHRING, Assistant Director
DR. THEODORE DOWNS, Chief Curator, Earth Sciences
DR. FRED S. TRUXAL, Chief Curator, Life Sciences
DR. HARRY KELSEY, Chief Curator, History
RICHARD LIPSCOMB, Chief of Education

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY BOARD OF GOVERNORS

ED N. HARRISON, President
DR. M. NORVEL YOUNG, Vice-President
RICHARD CALL, M.D., Secretary
JOHN BROWN COOK
MRS. JUSTIN DART
TIMOTHY M. DOHENY
C. V. DUFF
WILLIAM M. GARLAND, II
DAVID W. HEARST
NORMAN O. HOUSTON
FREDERICK LLEWELLYN
CHARLES O. MATCHAM
RICHARD C. SEAVER
MYNATT SMITH
MRS. E. HADLEY STUART, JR.

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY BOARD OF TRUSTEES

RICHARD CALL, M.D., President
DR. M. NORVEL YOUNG, Vice-President
MRS. E. HADLEY STUART, JR., Secretary
RICHARD C. SEAVER, Treasurer
C. F. GEHRING, Assistant Treasurer
RICHARD P. CARLSBERG
JOHN BROWN COOK
MRS. JUSTIN DART
TIMOTHY M. DOHENY
WILLIAM W. DREWRY, JR.
C. V. DUFF
WILLIAM M. GARLAND, II
ED N. HARRISON
LEWIS J. HASTINGS
DAVID W. HEARST
NORMAN O. HOUSTON
MRS. EDWARD B. LILLY, JR.
FREDERICK LLEWELLYN
DOUGLAS J. MACDONALD
CHARLES O. MATCHAM
JACKSON SESNON
MYNATT SMITH
JOHN G. WIGMORE

NATURAL HISTORY MUSEUM ALLIANCE BOARD OF DIRECTORS 1972-1973

MR. LEWIS J. HASTINGS, Chairman of the Board
MR. LAWRENCE JEFFRIES, First Vice Chairman
MR. JOHN WIGMORE, Second Vice Chairman
MR. FRANK GRANT, Third Vice Chairman
MRS. THOMAS REDDIN, Secretary
MR. WILLIAM W. DREWRY, JR., Immediate Past Chairman

ELECTED BOARD

MRS. M. L. BRITTAIN, III
MR. RICHARD P. CARLSBERG
MR. MICHAEL DART
MRS. ROBERT EDWARDS
MRS. ALLAN HERBERT
MRS. JOHN HUBBARD
MR. JOHN JONES
DR. JOSEPH KRAUSE
MRS. MAURICE MACHRIS
MR. G. EVERETT MILLER
MR. ROBERT P. MILLER, JR.
MRS. LLOYD MILLS, JR.
MRS. MAX MINTZ
MR. RANDALL MYERS
MRS. STEPHEN P. NEWMARK
DR. WALTER NICHOLS
MRS. PAUL O. PLATT
MRS. EWING SELIGMAN
MR. MELVIN SHAW
MR. WILLIAM E. SIEGEL
MRS. LEON I. SINGER
MR. HOWARD SMITS

MEMBERS-AT-LARGE

MRS. DAVID DUQUE
MRS. RICHARD SCHUUR

HONORARY LIFE MEMBERS

MR. C. V. DUFF
DR. HERBERT FRIEDMANN
MR. ED N. HARRISON
MISS RUTH MAHOOD
MR. CHARLES O. MATCHAM

HONORARY MEMBERS

MRS. BRUCE BELT
MRS. MORTIMER KLINE
MRS. KENNETH LEVENTHAL (EX-OFFICIO)
DR. GILES MEAD (EX-OFFICIO)
MRS. LYNN E. PARKHURST
MR. J. NEIL REAGAN
MRS. YUZY SATO
MRS. OSCAR A. TANNENBAUM
MR. JOHN R. THOMAS
MRS. BRUCE THROCKMORTON
MRS. IRWIN WEINSTEIN (EX-OFFICIO)

RESEARCH PANEL

MR. HARRY J. PACK
MR. ROBERT WEINSTEIN

ADMINISTRATIVE SECRETARY

MRS. FRAN KELLOUGH

Museum Alliance Membership

There is something in it for everyone! You are invited to become a member of the Natural History Museum Alliance, to participate in its programs, to receive its publications, and announcements.

Membership privileges and pleasures include:

1. Subscription to the Alliance TERRA
2. The monthly CALENDAR OF EVENTS
3. Family participation programs—NEW DIMENSIONS TO DELIGHT—tickets available only to members
4. 10% discount on most items at the Museum Bookshop and Ethnic Arts Shop
5. Invitations to previews and receptions for new exhibitions and to meet lecturers
6. Program of benefits for children
7. Group travel program

Memberships are available in the following categories:

Active	$12.50
Contributing	$25.00
Sustaining	$100.00
Life	$500.00 (single payment)

Make checks payable to: MUSEUM ALLIANCE
900 Exposition Boulevard
Los Angeles, California 90007